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STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

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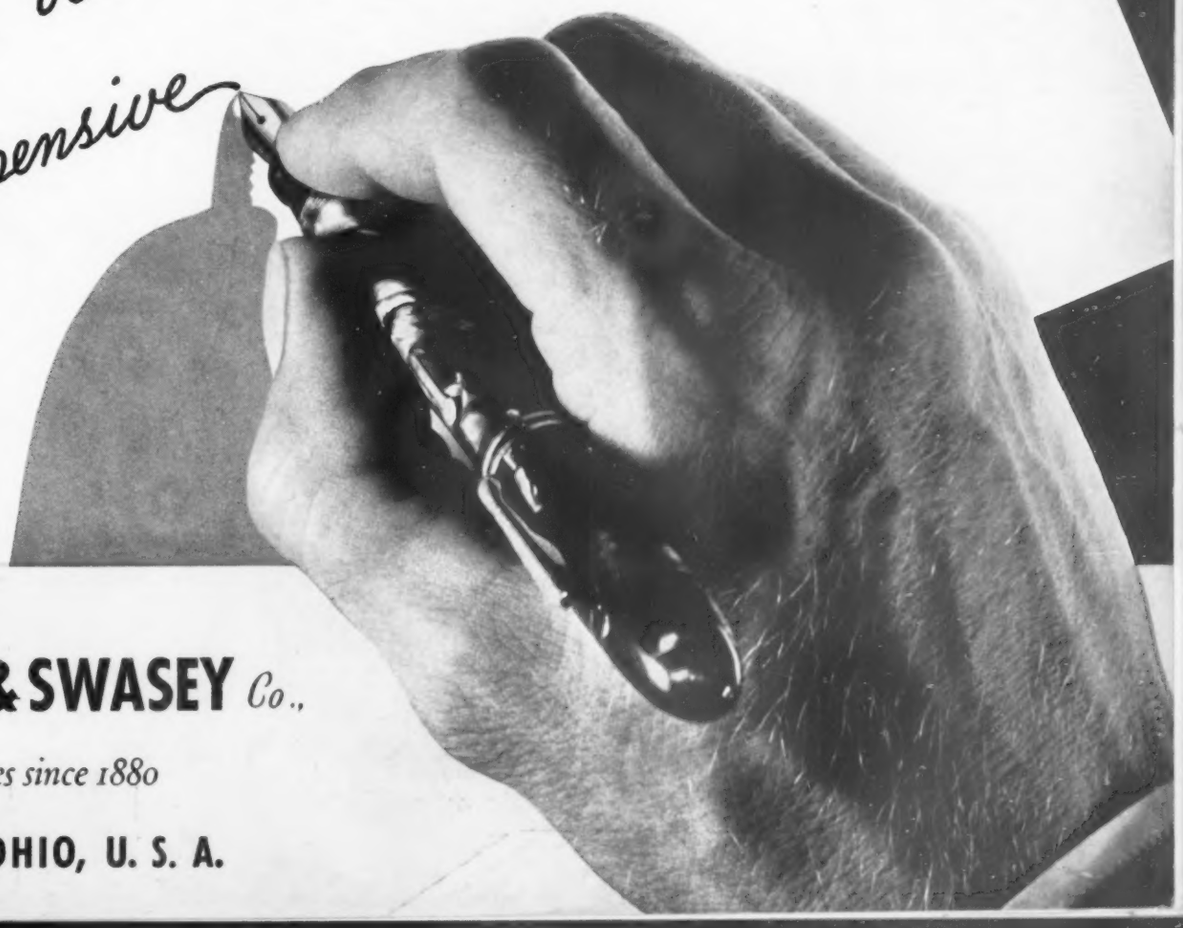
its not taking them out
but keeping them in, that
makes old machine tools
so expensive



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STEEL

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For forty-eight years—IRON TRADE REVIEW

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Contents . . September 2, 1935

Volume 97 ◆ Number 10

AS THE EDITOR VIEWS THE NEWS 21

Merges Carnegie and Illinois Steel; Fairless President 22
- Production 24
- Housing 24
- Merger 25
- Labor 25
- Dismantling 25
- New Capacity 25
- Meetings 25
- Users', Makers' Activities 33

Light Products Again Lead Steel Production 26
Mirrors of Motordom 27
Windows of Washington 29
A. I. M. E. Divisions Announce Program 30
Industrial Men in the Day's News 31
July Steel Exports Strongly Upward 32
Obituaries 32
Steel Engineers Announce Program 33
Welding Group Set for Fall Meeting 34

EDITORIAL—See Model Machine Shop! 35

THE BUSINESS TREND 36

ENGINEERING DEVELOPMENTS:
- Torch Deseaming 38
- New Heat-Resisting Alloy 41
- Improved Rotary Cutter 42
- Report of A.F.A. Meeting 44
- Methods and Materials 50
- Tantalum and Columbium 50
- Steel Compressor Decks 53
- Boring—Reaming Machine 54
- Robert E. Kinkead 56
- Wire Tying Machine 58
- Progress in Steelmaking 59
- Open-Hearth Design—XIV 63
- New Equipment 135

MACHINE TOOL SHOW AND CONGRESS SECTION 69-132
- Summary STEEL's Symposium "To Buy or Not To Buy" 74
- Program for Show and Congress Exhibitors 80
- Preview of New Equipment at the Show 89

MARKET REPORTS AND PRICES 139-161
CONSTRUCTION AND ENTERPRISE 161
ADVERTISERS' INDEX 180

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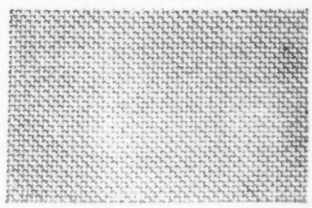
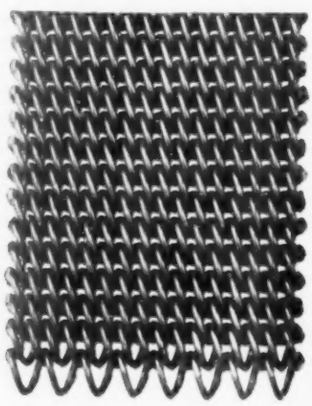


Silcrome Double Crimped Wire Cloth is used in many industries



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As the Editor Views the News

INDUSTRY unconsciously is establishing a custom of partitioning the calendar year into three parts. The dividing points are the major holiday periods. No. 1 is the Christmas-New Year week, No. 2 is Independence day and No. 3 is Labor day. The last named is important because it marks the end of vacations and the beginning of the fall term of business activity. This year Labor day is welcomed with more than ordinary enthusiasm because, for the first time in six years (p. 36), the prospect for good business over the remainder of the year is really promising. Undoubtedly, busy, interesting, potentially profitable days are ahead!

• • •

U. S. Steel Tries Unification

In coming months, industry will be alert to catch the significance of moves of U. S. Steel to co-ordinate the activities of its subsidiaries. The decision announced last week (p. 22) to unify the direction of operations and sales of the Carnegie and Illinois companies shows that the directors are prepared to adopt extreme measures. U. S. Steel proved in court that its bigness does not transgress man-made laws, but, in company with other large corporations, it has learned that bigness without efficiency does violate economic laws. Its latest attack on its big problem will write a new chapter in the book of industrial organization.

• • •

Don't Miss This Event!

More than a score of pages in this issue are devoted to descriptions of new machine tools and allied equipment (p. 89) which will be exhibited at the machine tool show in Cleveland, Sept. 11 to 21. Others were described in earlier numbers and many more will be handled in forthcoming issues. Never before have so many new tools been introduced in such a short period of time. In fact, most of the 900 machines to be displayed at the Cleveland show are brand new and never have been seen outside of the plants where they were built. The show, the third to be sponsored by the National Machine Tool Builders association (p. 80), will merit designation as the world's most modern machine shop. One cannot overestimate the economic significance of the progress that will be reflected in this exposition. Our tip is, "Don't miss it."

• • •

Putting Ideas To Work

Elbert Hubbard is said to have observed that one of the most difficult problems in business is to "put salt on the tail of a good idea." For a decade or more, architects, builders, producers of materials, fabricators and others have been trying to capture elusive ideas which will transform the dream of a practical metal house into a commercial reality. Considerable progress has been made. One of the latest developments (p. 25) is a residence in which a copper exterior is applied to a framework of light steel shapes. Each new step in the evolution of the modern home hastens the day when this market will become attractive to the metalworking industry. It also promises to absorb the large tonnage of flat-rolled steel which the wave of wide continuous mills will wash up on the market.

• • •

Competitive or Complementary?

Chromium, iron and aluminum are elements in a new heat-resisting alloy (p. 41), which when used in metallic resistors for heating and melting will permit the furnace to be operated safely at 2400 degrees, Fahr. . . . Any steel foundryman who has worried over the encroachment of welded rolled steel products upon the field of cast steel will do well to look into the possibilities afforded by welding cast steel to cast steel or cast steel to rolled steel. Foundrymen at the A. F. A. meeting in Toronto (p. 44) were shown specific examples of how the proper combination of cast and rolled steel in difficult assemblies saves jobs that otherwise would be lost. Alert steel casting men will put salt on this idea.

E. L. Shaner

Steel Corp. To Merge Carnegie and Illinois Oct. 1, with Fairless Heading New Unit

PRODUCTION and sales of the Carnegie Steel Co. and Illinois Steel Co., both wholly-owned subsidiaries of the United States Steel Corp., will be consolidated Oct. 1 and directed from a central office to be established in Pittsburgh.

Heading up the new organization — presumably as president — will be Benjamin F. Fairless, who has resigned as executive vice president of the Republic Steel Corp. as of Sept. 15.

This announcement, made Aug. 28 by directors of the Steel corporation, only whetted speculation since it is generally regarded as the forerunner of further reorganization of the Corporation. Some look for further clarification following the meeting of the powerful finance committee in New York Tuesday.

What Will Happen at Chicago?

At most important points, district sales managers of Carnegie also have represented Illinois, or vice versa. Necessarily, an operating staff will be retained at Gary, South Chicago, and Joliet to supervise operations of Illinois plants there.

But apparently the Chicago office of Illinois will be reduced to a district sales office; the executive direction of both companies will emanate from Pittsburgh; and orders for the joint companies will be allocated for the most economical production or shipment. In fact, to a degree the latter is now current practice.

In the South, the Tennessee Coal, Iron & Railroad Co., under the presidency of John L. Perry, functions as the operating and sales control for all Corporation subsidiaries in that district.

With Carnegie and Illinois about to be combined, the American Sheet & Tin Plate Co., American Steel & Wire Co., National Tube Co. and American Bridge Co. are the outstanding subsidiaries which, in a broad sense, remain unintegrated. Plans for these subsidiaries have not been divulged, but are believed to be in the making.

Undoubtedly, the promised fourth step in the program inaugurated by Myron C. Taylor when he became active in the Corporation following the death of Judge E. H. Gary in 1926 is being consummated. First came revision of the capital structure; second, revamping of the Corporation's physical properties, with abandonment of the more unprofitable plants; third, adjustments in personnel; and now, fourth, a regrouping of subsidiaries.

There may be some connection with the waning interest of the Morgan interests in the Steel corporation, which has been precipitated by the hostile attitude of Washington toward the House of Morgan and wealth in general.

Indeed, it is not impossible that the unification now in process may be anticipatory of an adaptation to steel of the Roosevelt administration's antipathy toward large industrial concentrations. Combined, the steelmaking capacity of Carnegie and Illinois is 20,460,900 gross tons, or 29 per cent of the country's total of 68,894,717 tons.

Benjamin F. Fairless

Put in charge of the new Carnegie-Illinois combine, he will direct a steel organization totaling 20,460,900 tons of ingot capacity. He is a graduate of Ohio Northern university, and came up through the Central Steel Co. and United Alloy Steel Corp. into Republic, from which he recently resigned.

On the other hand, new dealers are expected to view with satisfaction a dispersal of control of the Steel corporation from New York, and the more or less emergence of it from financial control.

Both in Pittsburgh and Chicago headquarters of the Carnegie and Illinois companies last week a tense atmosphere prevailed as, amid suppressed excitement and unsatisfied expectancy, further official announcements were awaited. It was a crucial matter to many executives whether the consolidation would result in a drastic scaling-down of personnel.

Following the official announcement in New York Wednesday, W. A. Irvin, president of the Steel corporation, hurried from New York to Pittsburgh. Conferences lasting Wednesday and Thursday, with Mr. Irvin presiding, were participated in by G. G. Thorp, president of Illinois. On Thursday Mr. Irvin flew back to New York and Mr. Thorp returned to Chicago.

Incidentally, the retirement of Mr. Thorp as well as of W. J. Filbert, a director and chairman of the finance committee of the Corporation, has been rumored recently. At 67, Mr. Thorp is two years past the age for voluntary retirement and within three years of compulsory retirement.

Merchandising, the Problem

I. Lamont Hughes, president of Carnegie, is only 58, keenly experienced, and vigorously active in his work. Both Carnegie and Illinois have long lists of vice presidents and high executives.

Experienced observers in Pittsburgh have recognized the Corporation's difficulties with Carnegie and Illinois as being a merchandising problem—production having whipped long ago—because there was constant sales overlapping due to each making identical lines of heavy finished steel products.

At Pittsburgh hope was expressed last week that such subsidiaries which produce non-competing products, like wire, sheets and pig iron will retain separate sales and advertising identities, making for a more effective sales job. Whether Carnegie and Illinois will do this also is moot, because the unification plan, just announced, in the end may finally mean an actual merger of both down to the pettiest detail.

While the Corporation several years ago started out modestly enough to manufacture alloy steel by both Carnegie and Illinois, it is only recently that it vigorously got behind its program; some millions of dollars were appropriated for alloy plant extensions in the Chicago district, which were pushed to a speedy completion. The experience of Mr. Fairless has run

largely to the manufacture, development and sales of alloy steels in which stainless recently has loomed large.

In Pittsburgh it is believed that the undoubted merchandising ability of Mr. Fairless may be one key to his acquisition by the Corporation.

Scarcely could two other steel companies bring to a common union tradition and history so deeply rooted in the annals of the American iron and steel industry.

Illinois goes back to Capt. Eber B. Ward, of Detroit, who in 1857 erected a mill in North Chicago for re-rolling old rails. First to embrace the bessemer process for making steel, Captain Ward in 1864 built a converter in Wyandotte, a suburb of Detroit, and cast ingots from which at his North Chicago mill he rolled the first steel rails in the United States.

By 1889 Captain Ward's mill had absorbed some of its competitors and, capitalizing itself at $25,000,000, took the name Illinois Steel Co. John W. (bet-you-a-million) Gates, who had been buying rods from Illinois, was made a director and later, in 1894, president.

Gary Impels Illinois

In the panic year 1893, Judge Elbert H. Gary, a decade later destined to become chairman of the United States Steel Corp., was consulted by Illinois in its financial difficulties. Asked for advice on the proposed acquisition of the Elgin, Joliet & Eastern railroad, connecting Chicago with the company's works at Joliet, Ill., Judge Gary countered with a recommendation that Illinois round itself out by purchasing iron ore and coke properties. The railroad was purchased later.

The result was a merger of the Minnesota Iron Co., in which the Morgan interests were dominant, with the Illinois Steel Co. in 1898, forming the Federal Steel Co., of which the late Judge Gary was the first president.

Carnegie's genealogy dates back to 1864, when Andrew Carnegie began making iron. It was not until 11 years later, or 1875, that Mr. Carnegie became impressed with the possibilities of steel.

Immediately he formed the Edgar Thomson steelworks at Braddock, Pa.; he shortly bought the Homestead and Duquesne works, acquired ore lands in the Lake Superior region, in 1889 entered into a partnership with Henry Frick and his coke properties, and by 1889, when the Illinois Steel Co. was organized, Carnegie was by all odds the largest steel producer.

Following various agreements in regard to rails and other products, Carnegie and Illinois came together when the United States Steel Corp. was launched on April 1, 1901.

What Carnegie and Illinois Will Bring to Steel Corporation Merger

	Carnegie	Illinois	Total
Blast furnaces, number	Edgar Thomson.. 11 Carrie..... 7 Duquesne..... 6 Ohio..... 6 Clairton..... 3 Mingo..... 3 Isabella..... 3 Farrell..... 2 Lucy..... 2 43	Gary... 12 South.. 11 Joliet.. 4 27	70
Pig iron, annual capacity, tons	9,263,300	7,037,900	16,301,200
By-product coke ovens, number	1,482	1,256	2,738
By-product coke, annual capacity, tons	6,157,000	5,762,000	11,919,000
Steel ingots and castings, annual capacity, tons	10,026,500	10,434,400	20,460,900
Open-hearth furnaces, number	Clairton..... 16 Duquesne..... 32 Edgar Thomson.. 16 Farrell..... 15 Homestead..... 65 Ohio..... 15 159	Gary... 54 South.. 43 97	256
Bessemer converters, number	Edgar Thomson.. 4 Mingo..... 2 New Castle..... 2 Ohio..... 2 10	Gary... 3 South.. 3 Joliet.. 3 9	19
Electric furnaces, number	Duquesne..... 1	South.. 6	7
Semifinished hot-rolled products for sale, tons	1,803,000	1,947,900	3,750,900
Annual capacity of finished hot-rolled products, tons:			
Rails	724,000	636,000	1,360,000
Splice bars and tie plates	94,000	227,200	321,200
Structural shapes—heavy	950,700	979,500	1,930,200
—light	312,000	.....	312,000
Sheet piling	100,000	15,000	115,000
Plates—sheared	741,500	962,000	1,703,500
—universal	392,500	348,000	740,500
Hot black sheets	12,000	200,000	212,000
Hoops, cotton ties and baling bands	36,000	.....	36,000
Hot rolled strip	480,000	591,000	1,071,000
Bars—other than concrete	1,399,700	1,310,300	2,710,000
Concrete bars	100,000	100,000	200,000
Skelp	294,000	165,000	459,000
Wire rods	.....	165,000	165,000
Blanks for seamless tubes	18,100	.....	18,100
Wheels (rolled)	56,900	48,000	104,900
Rolled blooms and billets for forging purposes	142,700	45,500	188,200
Total	5,854,100	5,792,500	11,646,600
Annual capacity of other finished products, tons:			
Forged axles	165,000	120,000	285,000
Iron molds and stools	245,000	211,800	456,800
Steel castings	4,400	21,000	25,400
Tie plates	.....	162,500	162,500
Angle bars and splices	.....	162,400	162,400
Splice bars and tie plates	80,000	.....	80,000
Fabricated flooring	30,000	.....	30,000
Automobile wheel discs	59,000	.....	59,000
Track spikes, screw spikes, bolts and nuts	.....	97,400	97,400
Miscellaneous	170,500	40,030	210,530
Total	753,900	815,130	1,569,030

Production

STEELMAKING held unchanged at 52½ per cent last week, after climbing steadily for seven successive weeks. A loss of 3 points at Chicago was offset by gains of 1 point at Pittsburgh and 2 points at Youngstown. Other districts to show minor increases were Wheeling, Cleveland, Birmingham. Details follow:

Youngstown—Gained 2 points to 62 per cent, and is expected to hold at this level starting this week. Carnegie Steel Co. added three more open hearths at its Ohio works, while Youngstown Sheet & Tube Co. lighted the A stack of its Campbell works.

Detroit—Remained at 94 per cent, one producer operating all eight and another melting in eight out of nine.

Pittsburgh — Advanced 1 point to 44 per cent, due to better orders for structural steel and some expansion in the automotive steel requirements, these offsetting the decrease in tin plate operations to around 78 per cent. A leading interest operated at 39 per cent, and other interests around 45-46 per cent.

Blast furnace operations are unchanged from the preceding week. Carnegie has 9 out of 32 on, Jones & Laughlin 7 of 11, Bethlehem 3 of 7 at Johnstown, and other producers one each.

Wheeling—Up 2 points to 78 per cent, with the addition of one open hearth to the active list.

Cleveland-Lorain — Up 5 points to 56 per cent, Corrigan, McKinney Steel Co. lighting one more open hearth to operate nine, and Otis Steel Co. one more, to operate five. National Tube Co., Lorain, continues with eight.

Birmingham — Active demand pushed the ingot rate up 5 points to 40½ per cent. Nine open-hearth furnaces are on active schedule, and others are in shape for quick resumption.

Buffalo—Held at 37 per cent, with 14 open hearths active. No general suspension is scheduled over the Labor day period, although some units are likely to be banked for three days. Immediately after the holiday, resumption of full operations, with 14 open hearths in production, is planned.

Chicago—Declined 3 points to 57 per cent, the first drop in five weeks. Most mills will retain a steady rate this week except for the Labor day interruption, with recovery predicted for later in September. Blast furnace operations are steady, 13 of 36 steelworks stacks being active.

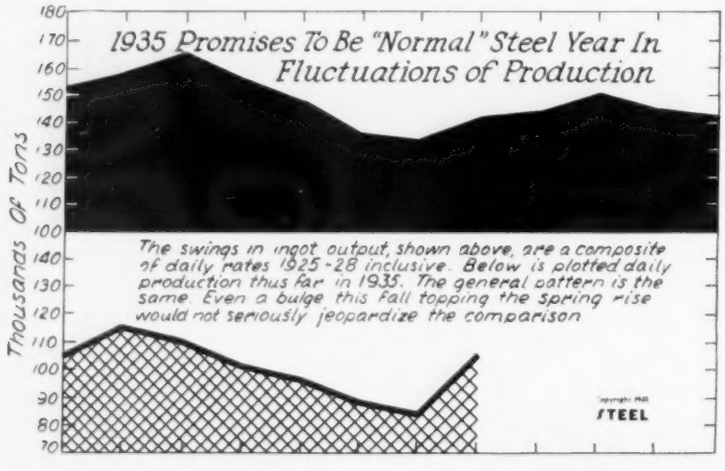
Central eastern seaboard—Held at 33 per cent last week and although there is the Labor day holiday this week, little variation is expected. Finished steel operations continue to hold up very well, and in both ingot and finished steel output August was substantially the best month this summer, the trend having been steadily upward throughout.

New England—Unchanged at 73 per cent last week, with a slight decline expected this week. One works which has been operating at 70 per cent will go to 60 per cent, while schedules at other plants remain the same.

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in 10 Leading Districts

	Week ended Aug. 31	Change	Same week 1934	Same week 1933
Pittsburgh	44	+ 1	10	36
Chicago	57	— 3	27½	46
Eastern Pa.....	33	None	18½	37
Youngstown...	62	+ 2	18	52
Wheeling	78	+ 2	26	80
Cleveland	56	+ 5	15	59
Buffalo	37	None	19	41
Birmingham..	40½	+ 5	30	55
New England	73	None	25	85
Detroit	94	None	77	55
Average	52½	None	18½	45



Housing

SEARS, ROEBUCK & CO., Chicago, will shortly offer for sale all materials, including steel, for prefabricated houses except for foundations. First of the new houses designed by General Houses Inc., Chicago, will be completed by late October in a Chicago suburb. Thirty different four to six-room plans for houses costing $2900 to $4200, exclusive of the lot and foundation, will be offered.

TO PUSH HEATING SYSTEMS

American Radiator & Standard Sanitary Corp., New York, is putting on a campaign to support the sale of complete heating systems built with all parts integrated, to be sold and adapted to the individual home by established heating contractors.

Color Card for Marking Bars Is Distributed

A proposed simplified practice recommendation covering a color code for marking steel in bars has been mailed to all interests by the division of simplified practice of the national bureau of standards, Washington, for their consideration and acceptance.

This recommendation, which was proposed and developed by the national committee on iron and steel of the National Association of Purchasing Agents, is limited to a color code for marking commonly used grades of steel, as represented by S.A.E. numbers, and staybolt steel.

The recommended color code, if approved by the industry, will be issued as a simplified practice recommendation and will be effective from a date which will be announced later.

McKesson Heads Pig Iron Sales for Carnegie

Carnegie Steel Co., Pittsburgh, Friday announced the appointment of James S. McKesson, who has been vice president of the Corrigan, McKinney Steel Co., Cleveland, as special sales agent to handle exclusively all sales of pig iron by Carnegie.

Carnegie will immediately get into production and maintain sufficient stocks of bessemer, basic, malleable, and foundry irons to be able to meet all requirements of the trade, according to the announcement. Mr. McKesson will maintain offices in Pittsburgh, the location of which will be announced later. Corrigan, McKinney, which Mr. McKesson has left, is in process of being merged with the Republic Steel Corp.

Labor

PAYROLLS in the iron and steel industry in July advanced nearly $1,000,000, or 2 per cent above June, although operations dropped 2 per cent, according to the American Iron and Steel institute. Payrolls of all employes amounted to $42,725,150, against $34,913,521 in July a year ago, despite the reduction in total number of employes. In July this year the total number of employes was 415,937, compared with 424,126 in the same period last year. Hours worked per week per wage earner averaged 31.5, against 24.4 a year ago.

SHEET MILL WAGES STEADY

Wages in sheet and tin plate mills having contracts with the Amalgamated Association of Iron, Steel and Tin Workers will be unchanged for September and October, as the average sales price of Nos. 26, 27 and 28 gage plain sheets in July and August was 2.65c, the same as in May and June. The wage rate is 15 per cent above base.

Dismantling

TWO Central furnaces of the American Steel & Wire Co., Cleveland, now being dismantled, will not be shipped to Japan, as has been rumored. The American Salvage & Trading Co., Cleveland, which is razing the furnaces, states they will be sold as scrap except for a few parts that can be salvaged and resold in this country.

Since early in the depression the American Steel & Wire Co. has not operated its Central furnace plant. It has obtained semifinished steel for its various works in Cleveland from the National Tube Co. plant in Lorain, O., also a United States Steel Corp. subsidiary. Two Central furnaces still remain.

New Capacity

AETNA-STANDARD ENGINEERING CO., Youngstown, O., has received orders, involving an outlay of approximately $50,000, for machinery for Bethlehem Steel Co.'s wide strip mill at the Lackawanna (Buffalo) plant. In addition, Aetna-Standard has received orders for finishing equipment for several other wide strip mills as well as additional equipment for shipment to Russia.

Meetings

MORE than 40 makers of industrial equipment, including American Steel & Wire Co., Parker-Kalon Co., Norma-Hoffman Bearings Corp., Ericsson Screw Machine Products Co., Carborundum Co., and Rawlplug Co., will exhibit at the third annual industrial materials exhibit at Hotel Astor, New York, Oct. 21-25.

Merger

ACQUISITION of the Wallingford Steel Co., Wallingford, Conn., by the Ludlum Steel Co., Watervliet and Dunkirk, N. Y., was assured last week when Ludlum received options to purchase substantially more than a majority of the stock of Wallingford. A statement by Ludlum follows:

Wallingford Steel Co. was organized in 1921 and was one of the first to manufacture cold-rolled stainless steel strip. During the depression this company has steadily increased its output of stainless steel and progress of the company has not been disturbed. It has steadily earned its dividends and has enlarged its facilities. It is now completing construction of a new mill that will enable the cold rolling of strip in stainless and other alloys, including for specific purposes some sizes of sheets and full finished tin mill black plate.

In addition to its regular output of high speed and carbon tool steels and other special steels, Ludlum's present range of sizes in the heat, wear and rust-resisting alloys runs from fine wire up through the bar mill ranges to billets and slabs for conversion into forms not rolled by Ludlum.

These negotiations, when finally approved, should open up to Ludlum the strip and sheet market in stainless and alloy steels and supplementing Ludlum's other products should result in a material increase in sales.

Structural Steel Framework Backs Copper Exterior of This Washington Residence

COPPER HOUSES INC., a subsidiary of the Kennecott Copper Co., 10 East Fortieth street, New York, and Fifteenth and K streets, Northwest, Washington, is now showing this copper house in Bethesda, Md., a suburb of Washington. The framework is structural steel, uprights being 4-inch channels bolted to a steel sill on the foundation and reinforced by a horizontal angle and criss-cross members. Floor joists also are steel. All exterior walls are copper plates weighing about 3 pounds per square foot, held together by a special extruded bronze shape bolted firmly to the steel framework. Outside walls are backed by a ½-inch com-

position board. The roof is 16-ounce sheet copper over a wood deck, with 4-inches of spun glass as insulation inside the walls and roof. Inside walls are plastered on steel mesh. All plumbing and piping are copper or its alloys. Air-conditioning is provided. Since the bearing of the house is entirely on the exterior steel walls, partitions can be changed at will, as in an office building. The builders claim costs quite comparable to brick or wood

Light Products Again Lead Steel Production

PRODUCTION and shipments of finished steel by 205 companies, members of the steel code of fair competition, for first half and second quarter, 1935, compiled by the American Iron and Steel institute, show a slightly lower condition than in the comparable periods of 1934.

In both periods this year the per cent of finishing capacity engaged was 45.1 compared with 46.6 per cent for first half and 56.6 per cent for second quarter, 1934. Total production, less shipments to members of the iron and steel code for conversion into code products, was 5,279,647 gross tons, for second quarter and 10,558,383 gross tons for first half, 1935. This compares with 8,059,174 gross tons and 13,337,090 gross tons for the corresponding portions of 1934. Estimated total steel finishing capacity, based on a yield from ingots of 69.4 per cent, is given as 46,832,700 gross tons as the 1935 base.

In general, light steel products in 1935 occupied a higher percentage of finishing capacity than the heavier, a situation existing for several years past. Thus, black plate production represented 64.2 per cent of capacity for the half year, 65.1 per cent for second quarter; tin plate, 67.1 for the half year, 74.7 for the quarter; total sheets, 67.6 for the half and 63.1 for the quarter; hot-rolled strip, 56.4 for the half and 49.8 for the quarter; cold-rolled strip 51.5 for the half and 46.0 the quarter.

In contrast, production of heavy shapes represented 21.5 per cent of capacity for first half, 24.2 for second quarter; plates, 19.5 for the half and 19.9 for the quarter; bars, 30.4 for the half, 29.5 for the quarter. An exception in heavy products is found in steel piling, in which 48.2 per cent of capacity was engaged during second quarter, 42.5 per cent for the entire half.

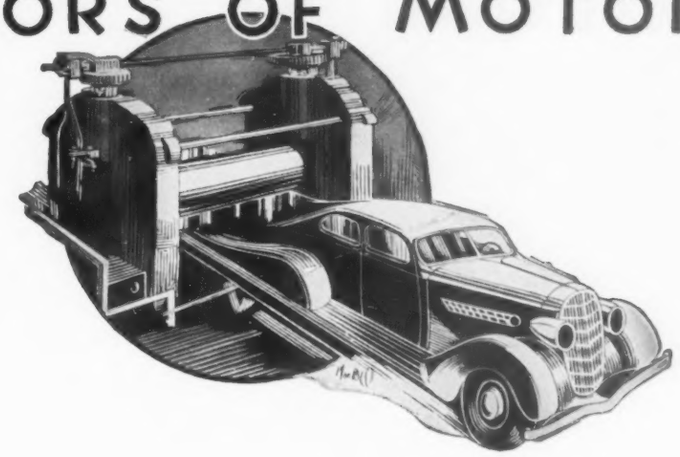
AMERICAN IRON AND STEEL INSTITUTE

Member Companies—Code of Fair Competition—Iron and Steel Industry—Capacity and Production for Sale

Second Quarter and First Half - 1935 (period)

		Number of companies	Items	Annual Capacity Gross tons	Production for Sale—Gross Tons: Current Quarter: Total	Current Quarter: Per cent of capacity	Current Quarter: Shipments: Export	Current Quarter: Shipments: To members of the Iron and Steel Code for conversion into Code products	To Date: Total	To Date: Per Cent of capacity	To Date: Shipments: Export	To Date: Shipments: To members of the Iron and Steel Code for conversion into Code products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	42	1	xxxxxxx	925,402	xxx	8,936	837,776	2,067,378	xxx	28,551	1,867,969
	Heavy structural shapes	14	2	5,440,820	328,534	24.2	8,081	-	585,830	21.5	17,209	xxxxxxx
	Steel piling	6	3	270,000	32,550	48.2	2,182	-	57,409	42.5	4,086	xxxxxxx
	Plates—Sheared and Universal	26	4	6,185,469	307,617	19.9	8,165	2,786	603,006	19.5	18,557	4,428
	Skelp	10	5	xxxxxxx	88,860	xxx	5,031	56,989	163,181	xxx	6,820	113,889
	Rails—Standard (over 60 lbs.)	7	6	4,170,000	204,181	19.6	10,163	-	355,266	17.0	11,938	xxxxxxx
	Light (60 lbs. and under)	9	7	805,820	16,038	8.0	6,510	-	30,376	7.5	7,051	xxxxxxx
	All other (Incl. girder, guard, etc.)	3	8	140,000	10,314	29.5	2,281	-	15,351	21.9	2,582	xxxxxxx
	Splice bar and tie plates	20	9	1,622,393	80,213	19.8	1,354	-	136,634	16.8	2,068	xxxxxxx
	Bars—Merchant	47	10	xxxxxxx	588,034	xxx	9,468	53,939	1,234,235	xxx	22,628	123,044
	Concrete reinforcing	37	11	xxxxxxx	127,434	xxx	1,808	-	220,661	xxx	3,943	xxxxxxx
	Cold finished—Carbon	18	12	xxxxxxx	108,158	xxx	1,420	-	232,945	xxx	2,723	xxxxxxx
	Alloy—Hot rolled	18	13	xxxxxxx	124,109	xxx	495	7,859	262,446	xxx	1,344	19,789
	—Cold finished	14	14	xxxxxxx	12,478	xxx	43	-	26,806	xxx	95	xxxxxxx
	Hoops and baling bands	8	15	xxxxxxx	11,735	xxx	269	-	22,407	xxx	384	xxxxxxx
	TOTAL BARS	72	16	13,166,885	971,948	29.5	13,503	61,798	1,999,500	30.4	31,117	142,833
	Tube rounds	8	17	xxxxxxx	15,561	xxx	-	15,815	31,415	xxx	-	26,954
	Tool steel bars (rolled and forged)	18	18	110,321	7,247	26.3	21	-	15,149	27.5	50	xxxxxxx
	Pipe and tube—B. W.	15	19	1,829,928	122,082	26.7	6,096	-	228,519	25.0	14,422	xxxxxxx
	L. W.	9	20	1,719,534	73,527	17.1	2,795	-	131,302	15.3	6,420	xxxxxxx
	Electric weld	3	21	813,571	15,018	7.4	25	-	29,109	7.2	125	xxxxxxx
	Seamless	15	22	2,519,978	211,147	33.5	6,566	-	387,080	30.7	15,539	xxxxxxx
	Conduit	6	23	142,350	9,330	26.2	-	-	18,944	26.6	-	xxxxxxx
	Mechanical Tubing	5	24	212,050	17,206	32.5	1,479	-	37,443	35.3	3,022	xxxxxxx
	Wire rods	20	25	xxxxxxx	119,565	xxx	4,721	64,338	245,457	xxx	9,717	125,003
	Wire—Drawn	46	26	1,777,276	207,776	46.8	10,637	3,579	431,507	48.6	19,056	6,100
	—Nails and staples	24	27	1,173,362	100,965	34.4	3,184	-	193,479	33.0	6,639	xxxxxxx
	—Barb., fence, bale ties, fence posts, etc.	28	28	1,588,764	147,257	37.1	8,288	-	258,689	32.6	16,228	xxxxxxx
	Black plate	15	29	428,879	69,829	65.1	8,090	25,148	137,658	64.2	4,050	48,259
	Tin plate	17	30	2,628,256	491,050	74.7	34,487	-	882,404	67.1	80,616	xxxxxxx
	Sheets—Hot rolled	26	31	xxxxxxx	242,872	xxx	4,499	22,571	557,764	xxx	9,546	44,994
	Hot rolled annealed	26	32	xxxxxxx	333,884	xxx	11,834	106	717,547	xxx	22,771	1,185
	Galvanized	19	33	xxxxxxx	203,466	xxx	21,622	-	382,043	xxx	41,279	xxxxxxx
	Cold rolled	20	34	xxxxxxx	373,123	xxx	11,476	-	817,044	xxx	19,680	xxxxxxx
	All other	16	35	xxxxxxx	89,945	xxx	1,799	-	189,435	xxx	3,406	xxxxxxx
	TOTAL SHEETS	37	36	7,880,967	1,243,290	63.1	51,230	22,677	2,663,833	67.6	96,682	46,179
	Strip—Hot rolled	36	37	3,478,052	433,028	49.8	7,963	41,260	980,013	56.4	17,234	103,115
	Cold rolled	41	38	1,026,454	117,975	46.0	2,754	-	264,438	51.5	4,655	xxxxxxx
	Wheels (car, rolled steel)	6	39	398,284	17,053	17.1	902	-	43,809	22.0	7,686	xxxxxxx
	Axles	10	40	441,900	4,527	4.1	320	-	10,599	4.8	1,159	xxxxxxx
	Track spikes	12	41	345,760	20,066	23.2	395	-	33,460	19.4	597	xxxxxxx
	All other	7	42	21,207	2,057	38.8	728	-	4,874	46.0	1,822	xxxxxxx
	TOTAL CODE STEEL PRODUCTS	176	43	xxxxxxx	6,411,213	xxx	210,887	1,132,166	13,043,112	xxx	435,798	2,484,729
	Estimated total steel finishing capacity based on a yield from ingots of 69.4 %		44	46,832,700	xxxxxxx	45.1	xxxxx	xxxxxxx	xxxxxxx	45.1	xxxxxxx	xxxxxxx
	Pig iron, ferro manganese and spiegel	35	45	xxxxxxx	867,626	xxx	1,478	234,019	1,541,461	xxx	2,172	506,607
	Ingot moulds	6	46	xxxxxxx	57,227	xxx	1,830	-	123,637	xxx	2,821	xxxxxxx
Iron Products	Plates	1	47	32,160	750	9.4	-	-	1,055	6.6	-	xxxxxxx
	Skelp	1	48	-	989	-	289	700	1,907	-	560	1,347
	Bars	13	49	238,919	9,900	16.6	2	320	21,336	17.9	3	780
	Splice bars and tie plates	1	50	50,000	5,073	40.6	-	-	6,629	26.5	-	xxxxxxx
	Pipe and tubes	4	51	213,153	8,598	16.1	42	-	17,068	16.0	102	xxxxxxx
	Sheets	1	52	18,000	169	3.8	-	-	225	2.5	-	xxxxxxx
	All other	5	53	53,300	2,583	19.4	-	-	5,235	19.6	-	xxxxxxx
	TOTAL IRON PRODUCTS (ITEMS 47 to 53)	18	54	547,572	28,071	20.5	333	1,020	53,455	19.5	665	2,127

MIRRORS OF MOTORDOM



DETROIT

GENERAL MOTORS is first to swing into production of new models, and presumably also will be first to announce.

Buick is starting its third week on 1936 jobs, is pushing its daily rate up to about 250, and by the end of this week will have assembled about 3000 of the new series. Sept. 28 still is the date for the formal debut, although pre-views will be staged.

Cadillac began dropping new models off the line last week, to be followed shortly by a start on LaSalle. Cadillac becomes a turret top car, as LaSalle did early in the summer; hydraulic brakes and greater streamlining are other features. An announcement concerning both lines is expected within a week or ten days.

Pontiac is expected to reopen shortly—possibly this week, but Olds may be down several weeks longer owing to extensive readjustments both in its own plant and the Fisher Body division. In both lines, changes will be comparatively minor, chiefly body and styling refinements.

80,000 Chevrolets in October

Chevrolet gear and axle division has reopened on units for 1936 Chevrolets; 80,000 are scheduled for September, indicating assembly in that volume in October. It now appears that Chevrolet changes will be less sweeping than originally expected, and will be largely concentrated in a redesigned front end. This, however, will radically alter the appearance.

Chrysler plants remained closed last week. First of the lines on which a start for 1936 will be made will be the Chrysler airstream. Competing in the price range of the Pontiac eight, Olds six and eight, Hudson, Nash, Studebaker and the lower rungs of Buick, this line will be vigorously pushed for 1936.

Meanwhile, it is understood that the production of Chrysler airflow bodies has been pulled into the Kercheval plant, which is comparatively small and indicates that the blunt-nosed airflow series—at least on the Chrysler chassis — will virtually become a custom job.

There is a hint that this Chrysler airstream series will be introduced about Sept. 20, or about a week before Buick, which would intensify the competitive situation. Chrysler jobs are expected to have rear trunks this year, which has involved an intricate problem in design owing to the extreme slope.

Not to imply copying but merely to indicate the type, those "in the know" say that the new Plymouth has general lines resembling Pontiac and that Dodge is reminiscent of Olds.

One-Piece Top for Hudson

As has been previously stated in this department, the intense competition between Ford, Chevrolet and Plymouth in the lower brackets should not obscure the increasingly tense situation in the bracket just above this triad, which includes Dodge, Olds, Pontiac, Hudson, Nash and Studebaker—to mention only six.

The Chrysler schedule for September is 34,000 units, and for October 70,000.

Completing its run on 1935 models, Hudson-Terraplane is starting to re-tool, among other thing installing a 900-ton press in its Gratiot plant here to form its new style steel top.

After all, this new Hudson-Terraplane top will be one solid piece, coming down into the ball or rounded portion of the rear quarters. The die for this one-piece top weighs 147,000 pounds, and the capacity of the press, whose reinforced concrete bed is 18 feet deep, is 90 tops per hour.

This is the year in which Hudson-Terraplane makes a complete body changeover, and the line will be complete restyled, with bodies larger and more radically streamlined than this year. Incidentally, Hudson's statement as of June 30 shows substantial improvement in its cash and working capital position; current assets being $13,630,395 against current liabilities of $3,019,978.

However, most radical of all lines for 1936 probably will be Auburn. It will be recalled that Auburn enjoyed its greatest prosperity when it went radical. While Graham sired fender skirts and slanting radiator grilles, Auburn led the procession several years preceding with body moldings, large hub caps, fancy louvres and unorthodox treatment of the radiator shell. Auburn has languished the past couple years chiefly because the rest of the industry has caught up with it.

Auburn's big play, apparently, is to go radical. This year it had a supercharger, which will not be generally followed. Next year one series will have a Cummins diesel engine, another will have front-wheel drive, reviving and perfecting the drive featured on Cord several years ago. Auburn has been assembling about 100 cars a week recently.

Willys Is Buying Steel

Willys has been buying steel and other materials for the 10,000 cars which the receivers have been granted permission to build. The court, however, has stipulated that these 10,000 cars must be completed by Feb. 15, that there will be no further authorizations, and the remaining plants must be reorganized or liquidated by that time. The Wilson Foundry division at Pontiac is reopening Sept. 3, employing 300 persons.

The passing last week of John N. Willys recalls the spectacular career of this original Overland dealer in Elmira, N. Y., who in 1907, finding the Overland plant in Indianapolis financially involved, took it over and became a manufacturer.

To obtain additional production he

raised a circus tent adjoining the plant, then purchased the Pope-Toledo plant in Toledo and built it up into the Willys-Overland organization which brought him $25,000,000 in 1929 for his common stock control.

In 1932 the voting clause of the preferred which Mr. Willys retained returned control to him. As previously noted, Feb. 15 is now the deadline for a reorganization or dispersal.

Packard is again turning out the large series, changes in which are minor, chiefly in the fenders. Production of the 120 series will be resumed early in September; refinements will include hanging the doors at the front.

Hupp production has rebounded following the slowing-down incident to changing dies for the built-in trunk on all models, and has snapped back to about 150 a week. It is understood that Warner Gear is building an overdrive transmission for Hupp, as it also is for Chrysler.

For steel and other supply industries, last week was a sort of lull before the storm.

Chevrolet has closed practically all its requirements for the first 250,000 cars of its new series.

Big Ford Steel Buy Nears

Ford, which bought heavily early in August, may specify 60,000 to 70,000 tons of flat rolled material, principally sheets, about Sept. 10. Incidentally, it has been placing parts for the small V-12 job which Lincoln will bring out.

Chrysler has made commitments for the 34,000 cars it will assemble in September, but has most of the material for the 70,000 scheduled for October still to distribute.

Fisher Body has been anticipating General Motors needs, and has been buying almost without a break.

About Sept. 10 or 15 heavy specifications for shipment late in the month for October assemblies are expected. Thus far shipments of bar products for new models have been relatively heavier than those of flat rolled steel, with the reverse likely to be the situation this month.

Quite an upset has developed in the running board stamping business. Using round figures, the No. 16 gage stampings for running boards for cars of the Ford-Chevrolet-Plymouth type have been bringing about 57 cents each "in the white" or ready for the rubber. The cost of material is said to have been about 55 cents per stamping.

A new entry in this field, a subsidiary of a Mahoning Valley strip producer, is reported to have corralled much of this business at a price of about 51 cents. These prices are for the stamping only, and do not include the rubber mat.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,817
Feb.	105,447	230,256	335,700
Mar.	115,272	338,434	429,834
Apr.	176,432	352,975	477,746
May	214,411	330,455	364,727
June	249,727	306,477	361,320
July	229,357	264,933	337,049
Aug.	232,855	234,811	*220,000
8 mos.	1,442,326	2,214,007	*2,819,193
Sept.	191,800	170,007	.....
Oct.	134,683	131,991	.....
Nov.	60,683	83,482	.....
Dec.	80,565	153,624	.....
Year	1,920,057	2,753,111	.....

*Estimated.

Estimated by *Cram's Reports*

Week ended:

Aug. 3	69,415
Aug. 10	48,067
Aug. 17	56,386
Aug. 24	50,585
Aug. 31	49,115

Harsh notes between Washington and Moscow have not disturbed the lucrative business that has developed between Detroit and the Russian state automobile trust at Leningrad.

Recently it was chronicled here that the Soviet auto monopoly had placed considerable die work with Detroit shops. Now, through the Amtorg Trading Corp., New York, a large body builder has disposed of about 1500 tons of used heavy machinery, which is on its way now to Leningrad.

Green Makes Dillon President

Vice presidents of automobile manufacturers in charge of industrial relations are spending this week discussing the reactions to three developments—the organization meeting of the International Union of United Automobile Workers, which is an A. F. of L. body; Father Coughlin's mass meeting at Belle Isle Sunday, and the A. F. of L. Belle Isle rally Monday.

Everything was not smooth at the formal launching of the United Automobile Workers last week. After delegates refused to accept Francis J. Dillon as president, William Green, president of the A. F. of L., imposed him upon the organization. Such epithets as "skunk" and "quitter" were freely bandied about.

Buick is playing up a new rustproofing process which it has installed and put in operation for the 1936 models and which it claims to be the last word in providing protection to metal parts against corrosion. The process is part of the $14,500,000 modernization and expansion program of Buick.

This new bonderizing process employs the spray rather than the immersion method and was developed by the Parker Rustproof Co. With it all stamped metal parts and numerous other parts such as coil springs for knee-action are protected against rust and the effect of weather prior to lacquering or enameling.

The process is a further development of the basic bonderizing system, which consists of giving the metal parts a phosphate crystalline coating which not only prevents corrosion under the finish but also prevents spreading of corrosion from accidental scratches which penetrate to the bare metal, thereby increasing life of finishes.

Ford, which last week assembled 16,700 units, recently checked welds on the 1935 V-8 tudor sedan and disclosed 3415, with the number still increasing. Of these, 3154 were electric spot welds, 217 electric arc or oxyacetylene, and 44 electric butt welds.

Over 5000 Welding Operations

In the Rouge plant 5000 welding operations are carried on, five standard types of welding are used, and equipment includes more than 1000 welding torches and over 600 welding machines. Most of the machines are automatic, controlled by synchronous tube timers.

Stitchers which automatically fasten pieces of strip steel together so they can be wound for easy handling and storage and which require strips to be lapped two or three feet, are being displaced in the new strip mill building by an automatic spot welder. This fastens the strips together with 12 spot welds on a ¼-inch lap as the strip goes into the finishing rolls.

A new operation which has just been undertaken is in welding the outer panel of the automobile door to the door frame, to check movement and squeaking. Thirty-two spot welds make the panel and frame a single immovable unit, and the operation is performed by a Ford-built automatic machine. The door is placed in the machine, a button is pressed, a slide moves the door down into working position, then in a series of machine movements the 32 spots are welded, eight at a time. There are eight transformers in this machine, hung at the top of the machine instead of below it as is usual.

Oxy-acetylene welding is extensively used in the Rouge plant, but mostly on maintenance work. It is used notably for cutting out dies from plates up to 10 inches thick, and from forgings sometimes 2 feet thick. In production this type of welding is used chiefly for "tacking" operations on the body, especially in places which are hard to get at.

WINDOWS OF WASHINGTON

WASHINGTON

CONSIDERABLE surprise was shown during the closing hours of congress, even by high NRA officials, when the President sent communications to the chairmen of the senate finance and the house ways and means committees asking that NRA be replaced at the next session of congress.

Along with these communications went some tabulations and statistics, collected by NRA, showing chiseling in industry. It was notable that no mention was made of any labor or hour or price violations in the iron, steel or allied industries, although such figures were given for almost every other one of the principal industries of the country.

Figures—but of What?

Even high NRA officials were rather critical of the presentation, inasmuch as the tables did not show whether the figures were for manufacturing, wholesaling or retailing in the various industries or a combination of all of them. The report was exceedingly loosely drawn and raised considerable adverse comment when made public.

The figures showed for July, for all industries, violations of 5567 hour provisions, 1019 wages, 2463 hours and wages, and 2490 wage cutting. No place in the tabulation is it shown whether these violations are below the old code hours and wages or just what they are.

The President in his letters to congress asked that it be ready at the opening of the next session to take up new legislation to supplant the NRA.

He asked that a study of industrial conditions be made during the recess of congress with a view to "formulation of proposed legislation for preserving permanently to the nation such social and economic advantages as were gained through previous emergency enactments."

He suggested that such a study would enable the committees "to offer at the opening of the coming session a well-considered program for congressional action."

At the same time, in his letter the President urged industrial groups to take advantage of the present law extending some NRA provisions to make agreements on wages, hours, child labor, and unfair competition. These agreements would be made with the sanction of the federal trade commission, he pointed out, and with his approval.

"By such action," said the communication, "industry can undoubtedly do much to preserve the very substantial gains made while the codes were in effect."

The President also said that it is his "purpose during the adjournment of congress to call into conference representatives of management, labor and consumers in the hope that discussion will create among them a general agreement as to the best means of accelerating industrial recovery and the elimination of unemployment."

LOOK FOR STEEL AND AUTOS TO COMBAT NEW LABOR BOARD

It is expected here that the steel and the automobile industries will be the first to challenge the constitutionality of the new labor relations board.

Just before adjournment the senate confirmed the members of this new board, including Joseph W. Madden, of Pittsburgh, chairman; John M. Carmody, of New York; and Edwin S. Smith, of Massachusetts.

In spite of the fact that Chairman Madden announced that it would probably be a couple of weeks before the board would be set up and ready to receive complaints, one has already been filed by the United Automobile Workers charging the Bendix Products Corp., of South Bend, Ind., with refusing to recognize the union as representative of all of its employes. Charlton Ogburn, counsel for the auto workers, called the case one of the most important his union would lay before the board.

It looked for a time as though the new board would have a hard time getting along, inasmuch as congress adjourned without making any appropriation for the work of the board, but it has been found that $300,000 is still available from the unexpended balance of the old labor boards, and that will be used until congress appropriates for the board at the next session. It is stated that within a few days Chairman Madden will call all regional directors to Washington for an organization conference.

Green Scrutinizes Appointments

In connection with the appointments to this new labor board, William Green, president of the A. F. of L., gave his unqualified approval to the appointment of Mr. Smith, a member of the old labor relations board, but withheld his endorsement of the other two new members pending investigation of their labor records. Mr. Green said, however, their qualifications showed them "fitted to assume this most important post."

Mr. Madden, the new chairman, has been a law professor at a number of universities including Pittsburgh, West Virginia, Chicago and Ohio. He was arbiter in a Pittsburgh street car labor dispute at one time, and also was an assistant attorney general in 1920.

Mr. Carmody, an industrial engineer, has been in turn in recent years a mediator for the old national labor board, chairman of the bituminous coal labor board, and chief engineer for the CWA.

Mr. Smith, former labor commissioner of Massachusetts, was appointed to the labor relations board more than a year ago. In recent weeks he

has been setting up machinery for the new board to start running.

MARTIN, ONCE A STEEL MAN, IS NEW HEAD OF NRA

After having been headless for almost a month, the NRA at last has an administrator—Laurence J. Martin, of Aldie, Va., who has been executive officer since July 3.

Industrialists connected with the organization are glad of the choice, inasmuch as Maj. George L. Berry, official of the A. F. of L., was hot after the job and came very near landing it. Mr. Martin was not the man recommended to the President by James L. O'Neill, the recent administrator.

From 1921-1927 Mr. Martin was plant manager of the Mayhew Steel Products Co., of Hopewell, Va., and from 1927-1932 he was superintendent of textile production of Tubize-Chattillon, also at Hopewell, the later being a subsidiary of Du-Pont.

Mr. Martin went with the NRA in 1933 as special assistant to one of the deputy administrators in charge of equipment. He was later appointed assistant deputy, and then deputy in the same division.

On July 11, 1934, he was appointed chief of the NRA compliance division, and in July of this year NRA executive officer. He is a graduate of Randolph Macon and the University of Virginia.

FREER IS NEW REPUBLICAN MEMBER OF FTC

During the closing hours of congress the President sent up for confirmation the name of Robert E. Freer, or Ohio, as the Republican member of the federal trade commission.

This vacancy has existed for about a year since the resignation of George C. Mathews, and the term expires Sept. 25, 1938.

He was confirmed by the senate just before adjournment. The commission now, for the first time in more than a year, is complete.

Mr. Freer originally was from Cincinnati. He was an attorney with the interstate commerce commission from 1925-1933, and for the past two years has been special counsel in the office of Coordinator of Transportation Eastman.

For the past two months, also, he has been acting as special counsel for the senate committee on interstate commerce. He is a graduate of Ohio State, Cincinnati Law College and George Washington university.

HORSE SHOE TARIFF STANDS

Application for a tariff increase on horse or mule shoes of wrought iron or steel filed with the tariff commission by the Horseshoe and Allied Products Manufacturers' association, of New York, has been withdrawn, according to announcement by the commission.

WALSH NRA BILL FOR GOVT. SUPPLIERS STILL A MENACE

After having made one false start congress finally got away last week, but only after a five and a half hour filibuster by the senator from Louisiana — Huey Long — during which time he succeeded in killing the third deficiency bill, carrying appropriations for more than $100,000,000 and thereby causing the administration a number of headaches.

Included in the bills which were lost by the filibuster was an appropriation for the new labor relations board, the Guffey bill administration, social security and a large number of other government activities—most of which will be taken care of in some other way until congress returns.

However, the President has stated that at this time he sees no way of taking care of any payments under the social security law, although that organization will be set up and ready to go when congress comes back and gives the word.

One of the principal leftovers in congress is the Walsh government contract bill, which has caused those industrialists who know most about it considerable concern. Some of those closest to the bill do not believe that industry generally knows just how dangerous this bill can become. It is now in the judiciary committee of the house, and that will be its status in the next congress.

STEEL RATE HEARING DELAYED

Hearing set for Sept. 18 in Washington before Examiner C. K. Glover of the interstate commerce commission in connection with its investigation of iron and steel rates to South Atlantic ports has been postponed to a date to be announced.

A.I.M.E. Divisions Announce Program

AMERICAN Institute of Mining and Metallurgical Engineers announces the tentative program for the fall meeting of its Iron and Steel and Institute of Metals divisions to be held in Chicago, Oct. 1-3, in connection with the National Metal Congress. All technical sessions and the joint dinner will be at the Palmer House.

The detailed program, listing speakers and papers, is as follows:

Tuesday, Oct. 1

MORNING

Iron and Steel Division

Blast Furnaces and Raw Materials

"Production and Preparation of Blast Furnace Flux," by Paul C. Hodges.

"Blast Furnace Air-Blast Beneficiation," by Theodore Nagel.

"Separation of Hematite by Means of Hysteretic Repulsion," by E. W. Schilling and Harwick Johnson.

Institute of Metals

Constitution

"An Investigation of the Zinc-Rich Portion of the System Iron-Zinc," by E. C. Truesdale, R. L. Wilcox and J. L. Rodda.

"Influence of Lattice Distortion on Diffusion in Metals," by V. G. Mooradian and John T. Norton.

"A Study of the Molybdenum-Carbon System," by W. P. Sykes, Kent R. Van Horn and C. M. Tucker.

AFTERNOON

Iron and Steel Division

Roundtable on Qualities of Pig Iron

This session will constitute a general discussion without formal papers.

Institute of Metals Division

Reaction in Alloys

"Studies of Phase Changes During Aging of Zinc-Alloy Die Castings, II —Changes in the Solid Solution of Aluminum in Zinc and Their Relation to Dimensional Changes," by M. L. Fuller and R. L. Wilcox.

"Quenching Stresses and Precipitation Reaction in Aluminum-Magnesium Alloys," by R. M. Brick, Arthur Phillips and A. J. Smith.

"Notes on Crystallization of Copper," by Alden B. Greninger.

Wednesday, Oct. 2

NOON

Luncheon meeting, executive committee, Iron and Steel division.

Luncheon meeting, executive committee, Institute of Metals division.

AFTERNOON

Iron and Steel Division

"Initial Stages of the Magnetic and Austenitic Transformations in a Carbon Steel," by I. N. Zavarine.

"Notes on the Origin and Growth of Graphite Nuclei in Solid and Liquid Iron Solutions," by H. A. Schwartz and Wolfram Ruff.

Institute of Metals Division

Gas-Metal Systems

"Reduction of Chromic Oxide by Hydrogen," by F. C. Kelley.

"Solubility of Oxygen in Solid Cobalt and the Upper Transformation Point of the Metal," by A. U. Seybolt and C. H. Mathewson.

"Thermal and Electrical Conductivities of Copper Alloys," by Cyril Stanley Smith and Earl W. Palmer.

"An Apparatus for Determining Creep in Single Crystals," by R. F. Miller.

EVENING

Dinner of Iron and Steel and Institute of Metals divisions. Speaker: Carl W. Volz, Norwegian Smelting Works, Electric Furnace Products Co.; subject: "Metallurgy in Norway."

Thursday, Oct. 3

MORNING

Iron and Steel Division

Temperature Measurements of Liquid Iron and Steel

"Some Metallurgical Applications of the Fitterer Pyrometer," by G. R. Fitterer.

"Temperature Measurements with the Disappearing-Filament Optical Pyrometer," by W. E. Forsythe.

Iron and Steel and Institute of Metals Divisions

Science Lecture

"Recent Developments in Isotropic Chemistry," by Harold Clayton Urey, professor of Chemistry, Columbia university, New York.

Industrial Men in the Day's News

G. R. Carroll, New President, Association of Iron and Steel Electrical Engineers

Faithful work on committees paved the way for his selection as president.

Graduate of Carnegie Tech, his first industrial experience was with Pennsylvania Bell Telephone.

Since 1922 he has been with J & L at Aliquippa, for 5 years electrical superintendent.

G. R. CARROLL, electrical superintendent at the Aliquippa, Pa., works of Jones & Laughlin Steel Corp., whose election to the presidency of the Association of Iron and Steel Electrical Engineers for the 1935-36 term was noted in STEEL, Aug. 12, has been an active member of the association for nine years. Mr. Carroll has successfully filled many important committee assignments with the society.

He was graduated from Carnegie Institute of Technology with a degree of electrical engineer in 1915, and shortly afterward became identified with the Bell Telephone Co. of Pennsylvania as equipment engineer.

Two years later, in 1917, Mr. Carroll became associated with the William B. Scaife Co., Oakmont, Pa., in the capacity of erection engineer. He remained with the Scaife company for five years, until 1922.

At the latter date he became assistant electrical superintendent of the Aliquippa works of Jones & Laughlin, and held that position until 1930, when he was promoted to superintendent of the department.

In his new position with the Iron and Steel Electrical Engineers' association, Mr. Carroll succeeds W. H. Burr, mechanical and electrical superintendent of Lukens Steel Co., Coatesville, Pa.

♦ ♦ ♦

Earl F. Blank has been appointed director of the recently-created personnel relations department of Jones & Laughlin Steel Corp., Pittsburgh. Prior to joining Jones & Laughlin as director of the safety and welfare department in 1925, Mr. Blank was engaged in accident prevention and personnel administration with Ford Motor Co. from 1915 to 1918, then with the Buick Motor Co. until 1923, when he was transferred to supervise the safety work of the General Motors Corp.

♦ ♦ ♦

E. R. Crawford, president of the McKeesport Tin Plate Co., McKeesport, Pa., has been elected a director of the Blaw-Knox Co., Blawnox, Pa.

♦ ♦ ♦

F. R. Parks has been placed in charge of the newly-opened division office of the Bridgeport Machine Co., Wichita, Kans., at 1401 Magnolia building, Dallas, Tex.

♦ ♦ ♦

Robert L. Pierce, of the St. Louis district sales office of the Republic Steel Corp., has been placed in charge of the new Kansas City, Mo., office opened by Republic Sept. 1 at 622 Dwight building.

♦ ♦ ♦

William Wearne, Duluth, general superintendent of iron ore properties of Inland Steel Co., Chicago, retired voluntarily Sept. 1 to take up his residence in San Diego, Calif.

Mr. Wearne, a graduate of the Houghton School of Mines, came to Inland in 1906 as the superintendent of the Laura mine when that property was taken over by the company, and since that date all of the developments of the company with respect to iron mining have taken place under his supervision. He developed the company's mines on the Cuyuna range and later supervised the taking over of the Morris and Greenwood mines on the Marquette range. No announcement has been made as to his successor.

♦ ♦ ♦

J. R. Stewart, 17511 Pennington drive, Detroit, has been appointed representative of Read Machinery Co. Inc., for that company's mixing equipment, except for the bakery and food industries, in the lower peninsula of Michigan.

♦ ♦ ♦

R. L. Comport, of Chicago, who has been representing the National Steel Co., 1319 Kingsbury street, Chicago, in Wisconsin and Michigan, has been transferred by the company to Milwaukee, where he will have headquarters in the future.

♦ ♦ ♦

E. S. Miller has resigned as general superintendent of the Rotary Electric Steel Co. (Michigan), of Detroit. He formerly was general superintendent of the Elyria, O., plant of the Columbia Steel Co.

♦ ♦ ♦

Floyd T. Whitney has been appointed manager of sales of the Cohoes Rolling Mill Co., Cohoes, N. Y., succeeding H. R. Slater. Mr. Whitney went with the Cohoes company 12 years ago on leaving Rensselaer Polytechnic institute, Troy N. Y., where he studied chemical engineering. For the past five years he has been in charge of the Chicago office.

Floyd T. Whitney

J. J. Minskey succeeds Mr. Whitney in the Chicago office.

♦ ♦ ♦

G. A. White has been appointed vice president in charge of operations of Rotary Electric Steel Co.,

(Michigan) Detroit, effective forthwith. Mr. White is well known in the industry through varied experience along metallurgical and production lines over a period of years, both in this country and abroad. He formerly was metallurgist for the Titanium Alloy Mfg. Co., Niagara Falls, N. Y., and also was with the Columbia Steel Co., Elyria, O.

♦ ♦ ♦

D. A. Currie, for 29 years with the Erie Foundry Co., Erie, Pa., manufacturer of forge shop equipment, and for the past 12 years vice president and general manager, has been elected president and general manager.

♦ ♦ ♦

J. M. McNeal, European sales manager in England and Continental Europe for the Landis Machine Co., is visiting the home office at Waynesboro, Pa. While in the United States, he will attend the National Machine Tool Builders' exposition at Cleveland.

♦ ♦ ♦

Dr. C. B. F. Young, technical director of the U. S. Research Corp., Long Island City, N. Y., and director of research at the Biolite Corp., New York, will give a course in practical chemistry and practical electroplating at Columbia university, New York, the coming college year. Dr. Young studied under Prof. Colin G. Fink.

♦ ♦ ♦

Carl C. Joys Jr., since August, 1924, associated with A. O. Smith Corp., Milwaukee, as a sales executive, and since 1927 a director of the company, has been elected a vice president. He will continue as director of sales of the oil and gas field products division and all other divisions, excepting automotive products.

♦ ♦ ♦

Ben K. Stroud has joined the sales force of the Los Angeles office of Jones & Laughlin Steel Corp., Pittsburgh. Since 1923 he has been in charge of the oil field engineering and service in California fields for National Tube Co.

Mr. Stroud, a native Californian, after graduation from the University of California served for several years with the Louisiana state department of conservation in charge of oil and gas resources.

Died:

B. H. Johnson, assistant to the president of the R. D. Wood Co., Philadelphia, in Toronto, Ont., Aug. 27, following his re-election last week as vice president of the American Foundrymen's association. A native of Lynn, Mass., and a graduate of Boston Tech, his business connections prior to his affiliation with the Wood company in 1925 included Taylor & Gooding, of Lynn; John T. Robinson Co., Hyde Park (Boston); and the Cresson-Morris Co., Philadelphia. Mr. Johnson was one of the organizers of the Gray Iron Founders' society, and was active in the Metal Manufacturers' association, of Philadelphia. Funeral services were held Aug. 29 at Swampscott, Mass.

♦ ♦ ♦

Harry E. Stitt, 58, former chief engineer and recently consulting engineer, the Austin Co., Cleveland, Aug. 23. A graduate of Pennsylvania state college in 1903, he was employed by Heyl & Patterson and the Jones & Laughlin Steel Corp., Pittsburgh, and the Carnegie Steel Co., Youngstown, O., before becoming associated with Arthur G. McKee & Co., Cleveland. Leaving the McKee interests in 1914, he went with the Austin Co. retiring as chief engineer on account of his health. He was a brother-in-law of Arthur G. and Willis McKee, of Cleveland.

Mr. Stitt is credited with having originated the principle of standardized unit construction for modern industrial buildings. He applied this idea in hundreds of plants erected by the Austin Co. between 1914 and 1935, under his engineering direction. During this period he also pioneered in the application of welding to industrial construction.

♦ ♦ ♦

Don M. Osborne, 67, retired owner of the former D. M. Osborne Machinery Co., Cleveland, in Cleveland, Aug. 23.

♦ ♦ ♦

Ferdinand S. Maull, 42, sales manager of the Fulton Iron Works, St. Louis, in that city Aug. 21. He had been with the company 20 years, starting as a draftsman.

♦ ♦ ♦

Thomas A. Edison Jr., oldest son of the late inventor and in charge of research engineering of Thomas A. Edison Inc, East Orange, N. J., in Springfield, Mass., Aug. 25. He was especially interested in internal combustion engines, taking out many patents. He was 59.

♦ ♦ ♦

Jonas Harry Fox, 67, president-treasurer, Commercial Boiler Works, Seattle, in Seattle, Aug. 19. Born in Chile, he settled in Seattle in 1890, for years being assistant manager of Moran Bros., shipbuilders, who constructed the battleship NEBRASKA. In 1907 he established the Commercial Boiler Works.

♦ ♦ ♦

Charles Fell Sr., 70, for 20 years general manager of the National Tube Co. plant at Lorain, O., prior to his retirement five years ago, at his home in Elyria, O., Aug. 28. At 16 he began as a machinist's helper in the steel mills at McKeesport, Pa., and worked his way up to charge of the Lorain plant.

July Steel Exports Strongly Upward

EXPORTS of steel and iron products in July, as compiled by the metals and minerals division of the department of commerce, show a gain of 7115 gross tons over June. Total exports for July were 296,802 gross tons, the largest volume since March, 1935, compared with 289,687 tons in June.

This gain was made in spite of a decline of 9319 tons in exports of scrap, which fell from 215,098 gross tons in June to 205,779 tons in July. To balance this loss of tonnage, iron and steel skelp exports rose from 530 tons in June to 10,500 tons in July, iron castings from 685 tons to 1344 tons, wire nails from 644 to 1277 tons, barbed wire from 2535 tons to 3547 tons, seamless oil line pipe from 1262 tons to 2441 tons, steel rails from 5933 tons to 7065 tons, tin plate from 7160 to 9639 tons and steel bars from 3645 tons to 5993 tons.

Cumulative exports for seven months of 1935 total 1,892,736 gross tons, compared with 1,486,367 tons for the same period in 1934. This is a gain of 406,369 gross tons for 1935. This is more than accounted for by a gain of 427,061 gross tons in scrap exports, the total in seven months of 1935 being 1,321,721 gross tons, compared with 894,660 tons in the same period of 1934.

Details of steel imports for July will be presented in STEEL next week.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Commodity	July, 1935	June, 1935	Jan. thru July, '35
Pig iron	122	417	1,543
Ferromanganese and spiegeleisen	4	1	39
Iron and steel scrap	205,779	215,098	1,321,721
Tin plate scrap	2,957	2,973	26,102
Waste-waste tin plate	1,100	2,584	16,239
Ingots, blooms, etc.	1,718	1,778	29,998
Bars, iron	44	53	658
Bars, steel	5,993	3,645	31,910
Bars, alloy steel	152	148	1,332
Wire rods	2,824	2,368	13,986
Boiler plate	207	130	833
Other plate, not fab.	3,303	2,749	21,009
Skelp, iron or steel	10,500	530	17,256
Iron sheets, galv.	343	99	1,066
Steel sheets, galv.	7,235	6,391	45,107
Steel sheets, black	7,506	9,711	60,876
Iron sheets, black	278	382	3,214
Strip steel, cold-rolled	1,574	1,311	10,392
Strip steel, hot-rolled	2,053	1,862	14,567
Tin plate, taggers' tin	9,639	7,160	63,334
Terne plate	46	161	1,403
Tanks, except lined	716	442	3,708
Shapes, not fab.	2,963	2,520	17,878
Shapes, fabricated	1,692	2,490	11,106
Plates, fabricated	98	92	936
Metal lath	51	62	412
Frames, sashes and sheet piling	115	210	3,244
Rails, 50 lbs. and over	7,065	5,933	24,099
Rails, under 50 lbs.	546	675	2,683
Rail fastenings	625	702	3,228
Switches, frogs, crsgs.	86	104	729
Railroad spikes	211	172	1,519
Railroad bolts, nuts	35	33	278
Boiler tubes, seamless	374	311	4,819
Boiler tubes, welded	102	17	436

(Please turn to Next Page)

Activities of Steel Users and Makers

A. O. SMITH CORP., Milwaukee, has booked 100 large glass-lined tanks from the Stroh Brewing Co., Detroit. The tanks will be 8½ to 11 feet in diameter and average 27 feet in length. Additional orders recently booked include 80 tanks of similar design for Goebel Brewing Co., Detroit, and Narragansett Brewing Co., Providence, R. I. Orders on the company's books will require operations at present capacity until after Jan. 1.

♦ ♦ ♦

William M. Bailey Co., Magee building, Pittsburgh, has been appointed Pittsburgh district representative for Shallcross Controls Inc., Milwaukee.

♦ ♦ ♦

Avery & Saul Co., South Boston, Mass., steel jobber, has been appointed distributor in New England of seamless steel and Toncan iron boiler tubes for the Globe Steel Tubes Co., Milwaukee.

♦ ♦ ♦

International Harvester Co., Chicago, has a payroll of 3900 workers at its Milwaukee works, compared with 1200 a year ago. Tractor demand is furnishing most of the orders but general business also shows marked improvement.

♦ ♦ ♦

American Electric Furnace Co., 27 Von Hillern street, Boston, has appointed Carman Adams Inc., 2970 West Grand boulevard, Detroit, as direct factory representative for the sale and service of all its products in Michigan.

♦ ♦ ♦

Kolb Refractories Co., Meadow and Jackson streets, Philadelphia, has been appointed sales representative for Simplex Engineering Co., Washington, Pa., to handle its interlocking suspended arch and side wall construction in the Philadelphia territory.

♦ ♦ ♦

Wilson Welder & Metals Co. Inc., North Bergen, N. J., has appointed A. M. Castle & Co., Chicago, as exclusive distributor of the Wilson shielded arc electrodes in the Chicago territory, including Iowa, Wisconsin, northern Indiana and western Michigan, and on a non-exclusive basis in Washington, Oregon and California.

♦ ♦ ♦

Designers For Industry Inc. has been organized with headquarters in Terminal Tower building, Cleveland, for styling and restyling machinery, all kinds of fabricated products and packages. The company announces that it now is restyling a lathe, a commercial dry cleaning machine, chairs, beds, gliders, safes, cooking utensils, tableware, a juice extractor and several other products.

Charles H. Oppenheimer, formerly with Wilbur Henry Adams & Associates, industrial stylists, Cleveland, is president of the new company. Designers and stylists associated with the new company include Onnie Mankki, Lawrence Blazey, and Glenn Tammen.

♦ ♦ ♦

Harnischfeger Corp., Milwaukee, has erected a new building to be used exclusively for the manufacture of P&H-Milwaukee electric hoists. The building will be ready for occupancy about Sept. 15.

♦ ♦ ♦

Bradley Washfountain Co. 2203 West Michigan street, Milwaukee, manufacturer of washfountains, bubblers and showers for industrial plants, reports a substantial gain in business volume over a year ago. Demand has been especially good from automobile factories, steel mills and mines and from Canadian governmental units. The Bradley line is being supplemented with units made of stainless steel and enameled pressed steel. Heretofore only composition marble fountains were made. The new lines are designed especially for food factories, schools and situations where appearance is as essential as utility. H. A. Mullett is president.

July Steel Exports Gain

(*Concluded from Page* 32)

Commodity	July, 1935	June, 1935	Jan. thru July, '35
Casing and oil-line pipe, seamless	2,441	1,262	13,916
Same, welded	103	94	3,610
Seamless black pipe, other than casing, etc.	104	160	1,788
Malleable iron screwed pipe fittings	249	245	1,839
Cast iron screwed pipe fittings	74	334	1,027
Cast iron pres. pipe, and fittings for	423	598	4,894
Cast iron soil pipe, and fittings for	373	297	2,338
Welded black steel pipe	1,228	941	10,563
Welded black wrought iron pipe	66	139	1,389
Welded galv. steel pipe	1,300	1,074	11,128
Welded galv. wrought iron pipe	66	80	590
Riveted iron or steel pipe and fittings	16	27	262
Plain iron or steel wire	1,170	1,598	8,988
Galvanized wire	1,383	2,766	12,244
Barbed wire	3,547	2,535	18,248
Woven wire fencing	358	177	1,235
Woven wire screen cloth	100	119	614
Wire rope	329	414	2,537
Other wire and mfrs.	620	335	3,077
Wire nails	1,277	644	6,148
Horseshoe nails	40	50	360
Tacks	29	40	231
Other nails, staples	343	160	1,605
Bolts, machine screws	536	430	3,804
Iron castings	1,344	685	5,735
Steel castings	371	152	1,628
Car wheels and axles	430	495	11,837
Horseshoes	21	33	121
Iron and steel forgings, n. e. s.	405	489	3,310
Total gross tons	296,802	289,687	1,892,736

Steel Engineers Announce Program

TWENTY-EIGHT technical papers appear on the tentative program or the thirty-first annual convention of the Association of Iron and Steel Electrical Engineers to be held at the William Penn hotel, Pittsburgh, Sept. 24-26. Concurrent with the meeting, the association will conduct its annual Iron and Steel exposition in the hotel.

All divisions of the association will participate in the morning and afternoon sessions on Tuesday, Sept. 24, and Wednesday morning, Sept. 25. The combustion engineering division will sponsor sessions on Thursday morning and afternoon, the mechanical and lubrication engineering divisions a session on Thursday morning; and the welding engineering division one on Thursday afternoon.

Special features of the program include an exhibitors' dance on Tuesday evening; a visit to the plant of the Weirton Steel Co., Weirton, W. Va., on Wednesday afternoon; and a formal reception on Thursday evening.

Approximately 100 companies manufacturing steel mill equipment and supplies will be represented with exhibits in the exposition. The exposition will be open Tuesday 1:30 to 5:30 p. m. and 7 to 10 p. m.; Wednesday and Thursday 10 a. m. to 10 p. m.

The tentative program for the convention is as follows:

Tuesday, Sept. 24

MORNING

Registration.

"Developments in the Iron and Steel Industry, 1934-1935," by W. H. Burr, electrical and mechanical superintendent, Lukens Steel Co., Coatesville, Pa.

"A Review of Sheet, Tin and Strip Mills," by Stephen Badlam, consulting engineer, Pittsburgh.

"Run-Out Table Motors and Generators for Hot Strip Mills," by G. A. Caldwell and S. F. Henderson, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.; W. B. Snyder, industrial engineering department, General Electric Co., Schenectady, N. Y., and L. E. Hildebrand, General Electric Co., Lynn, Mass.

AFTERNOON

"Industrial Relations," by Arthur H. Young, vice president, United States Steel Corp., New York.

"Material Handling in the Iron and Steel Industry," by G. N. Harmon, electrical superintendent, Republic Steel Corp., Warren district, Warren, O.

"Power Requirements and Other Factors Pertaining to Rolling Hot and Cold Steel," by E. Kieft, engineer of tests, Illinois Steel Co., Gary, Ind.

EVENING

National officers, national engineering

committees, members and guests will visit Iron and Steel exposition.
Exhibitors informal dance.

Wednesday, Sept. 25

MORNING

"Processing of Steel in the Finishing Departments," by R. J. Wean, president, Wean Engineering Co., Warren, O.
"Flat Rolling of Steel," by C. L. McGranahan, superintendent 76-inch hot strip mill, Inland Steel Co., Indiana Harbor, Ind.
"Manufacture and Use of Iron and Steel Rolls in Carbon and Alloys," by S. H. Griffiths and J. L. Campbell, Ohio Steel Foundry Co., Lima, O.
"Lubricants for Cold Rolling Strip Steel," by Dr. R. W. Moore, physicist, and E. S. Reynolds, sales engineer, Socony Vacuum Oil Co., New York.

AFTERNOON

Inspection trip to Weirton Steel Co., Weirton, W. Va.

Thursday, Sept. 26

MORNING

Combustion Engineering Division

"Insulation of Open-Hearth Furnaces," by Gilbert Soler, manager of research, Timken Steel & Tube Co., Canton, O.
"The Venturi Port," by George L. Danforth Jr., president, Open Hearth Combustion Co., Chicago.
"Pouring of Molten Steel," by J. P. Walters, open hearth superintendent, and Dr. E. G. Hill, director of research, Lukens Steel Co., Coatesville, Pa.
"Roof Temperature Control of Open-Hearth Furnaces," by M. J. Bradley, engineer, Leeds & Northrup Co., Philadelphia.

Mechanical and Lubrication Engineering Divisions

"Composition Bearings for Roll Necks and Other Purposes," by H. M. Richardson, application engineer, plastics department, General Electric Co., Lynn, Mass.
"Progress in the Use of Composition Bearings," by K. T. MacGill, manager, Glyco-Ryertex division, Joseph T. Ryerson & Son Inc., Chicago.
"Composition Bearings," by H. F. Horn, engineering department, Westinghouse Electric & Mfg. Co., Trafford City, Pa.
"Oil Flooded Bearings for Roll Necks," by J. H. Hitchcock, engineer, Morgan Construction Co., Worcester, Mass.
"Development of Specifications for Lubricants," by O. L. Maag, lubrication engineer, Timken Steel & Tube Co., Canton, O.
"Cutting Oils," by W. H. Oldacre, director of research, D. A. Stuart & Co. Ltd., Chicago.

AFTERNOON

All Divisions

"Absorption of Steel in Federal Projects," by Col. Horatio B. Hackett, assistant administrator, public works administration, department of the interior, Washington.

Welding Engineering Division

"Developments in Welding in 1934-35," by Grover A. Hughes, electrical engineer, Truscon Steel Co., Youngstown, O.
"Alternating Current Arc Welding," by W. W. Reddie, industrial department, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and E. Steinert, transformer engineering department, Westinghouse Electric & Mfg. Co., Sharon, Pa.
"Welding in the Steel Industry," by E. W. P. Smith, consulting engineer, Lincoln Electric Co., Cleveland.
"Welding with the Alternating-Current Arc," by H. A. Winne, industrial engineering department, General Electric Co., Schenectady, N. Y.
"Developments in the Use of the Oxyacetylene Process in the Iron and Steel Industry," by E. J. W. Egger, resident engineer, Linde Air Products Co., Pittsburgh.

Combustion Engineering Division

"Some Applications of Controlled Atmosphere to Heating of Steel," by T. B. Bechtel, engineer, Electric Furnace Co., Salem, O.
"Recent Developments in Bright Annealing of Sheets and Strip in Electric Furnaces," by A. N. Otis, industrial engineering department, General Electric Co., Schenectady, N. Y.
"Normalizing Furnaces," by W. E. Blythe, district manager, Driver-Harris Co., Detroit.

EVENING

Formal reception.

Welding Group Set For Fall Meeting

AMERICAN Welding Society has announced the tentative program for its fifteenth fall meeting to be held in Chicago, Sept. 30-Oct. 4, in connection with the National Metal congress and exposition. Headquarters will be maintained at the Palmer House, where all technical sessions will be conducted.

Sessions will commence on Monday afternoon, Sept. 30, and will continue through Friday morning, Oct. 4. One session will take the form of a symposium on methods of minimizing distortion, and another a symposium on low-alloy, high-tensile steels for welding purposes. Two sessions will be devoted to fundamental research in welding. The annual banquet will be served at the Palmer House on the evening of Oct. 3.

The tentative program, listing papers and authors, is as follows:

Monday, Sept. 30

MORNING

Registration.

AFTERNOON

Presentation of Miller Memorial medal.
"Bridge Welding—A Review of the Literature," by F. H. Frankland, American Institute of Steel Construction, New York, and vice chairman, committee to study welding of highway and railroad bridges.
"Nitrogen in Metallic Arc Weld Metal," by Dr. J. W. Miller, Reid-Avery Co., Philadelphia.

EVENING

Dinner meeting, board of directors.

Tuesday, Oct. 1

MORNING

Fundamental Research in Welding

"Spot Welding Problems," by J. H. Zimmerman, Massachusetts Institute of Technology, Cambridge, Mass.
"Bend Testing of Welds—A Summary," by M. F. Sayre, Union college, Schenectady, N. Y.
"Advantages of Welding in Continuous Structures," by Inge Lyse, Fritz engineering laboratory, Lehigh university, Bethlehem, Pa.

AFTERNOON

Fundamental Research in Welding

"Arc Welding with Pure Iron Welds," by Gilbert E. Doan, Lehigh university, Bethlehem, Pa.
"Investigations of Residual Stresses," by R. E. Jamieson, McGill university, Montreal, Quebec.
"Low Temperature Tests of Welds," by Otto Henry, Brooklyn Polytechnic institute, Brooklyn, N. Y.
"Creep Tests of Welds," by N. F. Ward, University of California, Berkeley, Calif.

EVENING

Conference and meeting of fundamental research committee, American Bureau of Welding. Scheduled for benefit of university research workers in fundamentals of welding.

Wednesday, Oct. 2

MORNING

"Tests to Determine the Feasibility of Welding the Steel Frames of Buildings for Complete Continuity," by W. M. Wilson, University of Illinois, Urbana, Ill.
"Welding All-Metal Radio Tubes," by M. L. Eckman, Thomson-Gibb Electric Welding Co., Lynn, Mass.
"A New General-Purpose Meter for Resistance Welding," by C. Stansbury, Cutler-Hammer Inc., Milwaukee.

AFTERNOON

Symposium on Methods of Minimizing Distortion

1—"Pressure Vessels," by J. T. Phillips, Foster Wheeler Corp., Carteret, N. J.
2—"Repair Welding," by George Hettrick, Anchor Welding Service Inc., Chicago.
3—"Light Gage Steel," by J. H. Blaha, General Household Utilities Co., Chicago.
"Machine Torch Cutting and Fabrication of Tool Equipment," by P. H. Danly, Danly Machine Specialties Co., Chicago.

Thursday, Oct. 3

MORNING

Symposium on Low Alloy Steels for Welding Purposes

"Development and Use of Low-Alloy, High-Tensile Steels in Welded Construction," by A. E. Gibson, Wellman Engineering Co., Cleveland.
"Welding of Alloy Steels," by H. L. Miller, Republic Steel Corp., Youngstown, O.; J. C. Holmberg, Struthers-Wells-Titusville Corp., Warren, Pa., and Corbin Chapman, Hedges-Walsh-Weidner Co., Chattanooga, Tenn.

AFTERNOON

"Welding of Alloy Steels," by J. C. Hodge, Babcock & Wilcox Co., Barberton, O.
"Effect of Generator Characteristics on the Weld," by J. H. Blankenbuehler, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
"Electrical Characteristics of the Welding Arc," by S. C. Osborne, Wilson Welder & Metals Co. Inc., North Bergen, N. J.
"Resistance Welding of Copper Alloys," by I. T. Hook, American Brass Co., Waterbury, Conn.

EVENING

Annual banquet.

Friday, Oct. 4

MORNING AND AFTERNOON

Inspection trips.

EDITORIAL

Do Not Fail To See Model Machine Shop in Cleveland!

THIS week in Cleveland workmen are busy transforming exhibition buildings with more than five acres of floor space into what unquestionably will be the most unusual machine shop the world has ever seen.

When this unique shop is ready for operation, its equipment will embrace 900 different machine tools, including 600 types, and hundreds of other appliances and accessories essential in modern machine shop practice. This equipment and these products, weighing about 2500 tons in the aggregate, require about 400 freight cars to transport them from the plants of their 250 builders located in 76 cities in 16 states. The value of the equipment of this machine shop will exceed $4,000,000. When the machines and their appurtenances are installed, power facilities capable of handling a load of 5000 kilowatts hourly wil be required to operate them.

But more significant than the number of machines or their value is the fact that everything in this remarkable machine shop will be brand new. Here will be a shop in which no critical observer will be able to point with scorn at anything he sees and say, "That model is obsolete." As a matter of fact the great majority of the machines in this shop will meet the eyes of the industrial public for the first time. Much of the equipment was designed especially with the view of introducing it on the occasion of the opening of this unique shop. More than that, dozens of companies have been hard pressed to complete their new products in time to make the deadline of the shop opening, so recently were the final plans for these machines completed.

Sweeping Changes in Machine Tool Design Have Occurred Since Last Show in 1929

This machine shop is the third machine tool show presented under the auspices of the National Machine Tool Builders' association. In size and in the economic significance of what it represents it surpasses by a wide margin all that could be reasonably claimed for its two predecessors.

The principal reason for this is that in the six years since the last machine tool show was held, the industry has gone through varied experiences which have contributed to an intensive development of new improvements in design and construction. It is believed that the changes in the past few years are more important in their potential influence upon the economic structure of this nation's industries than those introduced in any other period of comparable length in the history of this country.

The stimulus for these changes came from several divergent sources. For one thing, the introduction of improved materials for cutting tools prior to the depression made necessary the redesign of many machines to accommodate higher speeds, heavier cuts and other new requirements. Again, the refinement of mass production methods employed in the automobile, electric refrigerator and other similar industries imposed more exacting specifications upon the machine tool industry. Furthermore, a combination of greater need for accuracy and an increased scarcity of skilled workers provided a new incentive for tools which could be operated with semi-skilled operators and yet would turn out work to more exacting tolerances.

Show Gives Everybody an Opportunity To See Profit Possibilities of Latest Equipment

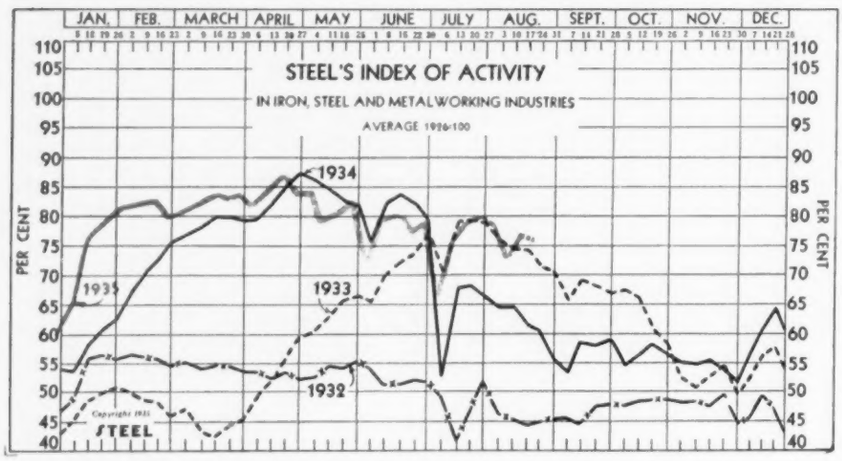
As a result of the challenge presented by these and other factors, the machine tool builders of 1935 have created models so improved in efficiency, economy and ability to do accurate work that many machines built only a few years ago have been made obsolete. In many cases the advantages of the new models over their predecessors are so marked that there can be no question as to the desirability—in fact the necessity—of replacing the old equipment with the new.

This is the keynote of the 1935 machine tool exposition. The machine tool builders want to prove to the industrial world that the newest machines will save money—that they will do so much for American industry that manufacturers cannot afford not to enjoy their benefits.

Every person in industry whose operations involve the use of machine tools will do well to spend as much time as possible at the Cleveland show. Never before in the United States has such a rich opportunity been offered to industrial executives to view under operating conditions equipment possessing such great potentialities for increased profits!

The exposition extends from Wednesday, Sept. 11, to Saturday Sept. 21. Do not fail to be among the 30,000 executives, engineers and others who will visit Cleveland during these ten days.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries declined 0.4 points to 77.1 in the week ending August 24:*

Week ending	1935	1934	1933	1932
June 15	80.0	83.6	72.1	51.8
June 22	77.3	81.8	73.9	51.6
June 29	78.4	79.4	77.0	49.2
July 6	64.1	52.3	71.4	41.7
July 13	76.5	67.8	79.1	46.7
July 20	79.8	68.1	79.4	51.5
July 27	80.8	66.4	78.8	46.1
Aug. 3	78.4	64.6	75.9	45.1
Aug. 10	73.4	64.6	74.7	44.6
Aug. 17	77.5†	61.4	74.2	44.9
Aug. 24	77.1*	60.3	71.6	45.2

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL*). Average for 1926 equals 100, weighted as follows: Steel rate 40, and car loadings, power output and auto assemblies each 20.*

Industry in Strong Position For Post-Labor-Day Pull

LABOR DAY finds most of the important barometers of business at levels which represent comfortable margins of gain over the corresponding figures for the past four and, in some cases, five years.

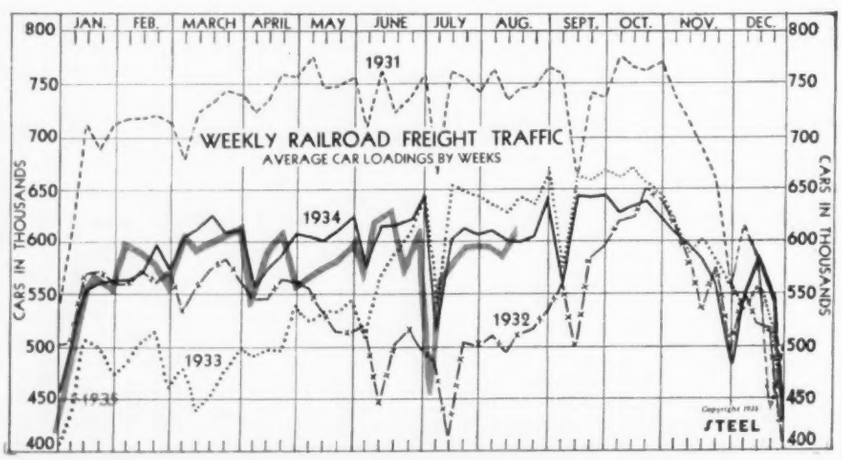
One barometer, namely electric power output, is at the highest point ever recorded at this time of the year. In fact, the output for the week ending Aug. 24 has been exceeded only twice. The two higher weekly production figures were recorded in the second and third weeks of December, 1919. A remarkable feature of electric power output in recent weeks is the steadiness with which it has clung to the narrow range between 1,800,000,000 and 1,839,000,000 kilowatt hours. The uniformity at high levels indicates that the present showing is not a mere flash in the pan.

Production of automobiles still is affected by the adjustments of the recent brief vacation period. Output in the third full calendar week of August declined from the previous week. This drop was sufficient to depress fractionally STEEL's index of activity in the metalworking industries, in spite of slight gains in electric power output, freight car loadings and steelworks operations.

All indexes for the weeks ending Sept. 1 and Sept. 8 will be affected by the slackening of activity over the Labor day holiday. The first significant indications of the post-holiday trend will be available about the middle of the month.

The current buoyancy of sentiment presupposes a strong upward surge in business before the end of September.

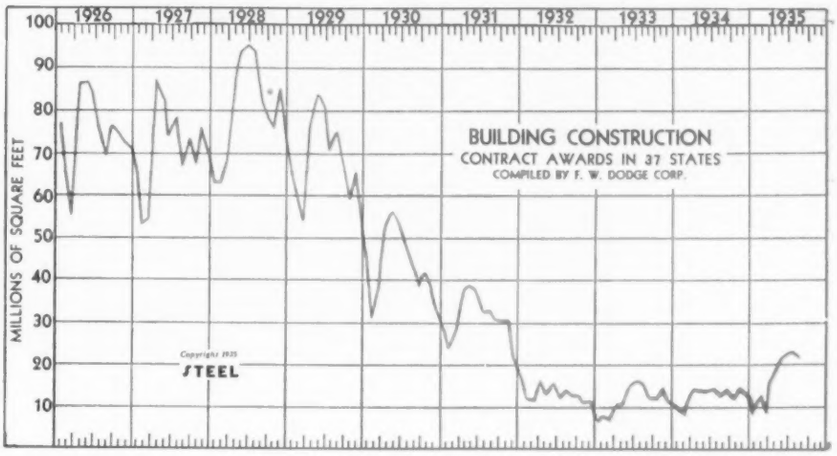
1935	
Aug. 17	615,006
Aug. 10	583,743
Aug. 3	597,083
July 27	596,462
July 20	593,366
July 13	566,488
July 6	472,421
June 29	618,036
June 22	567,847
June 15	653,092
June 8	630,836
June 1	565,342



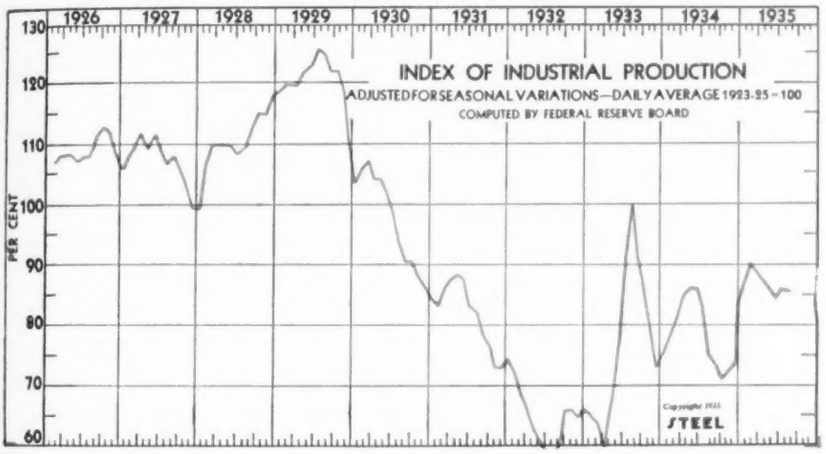
1934	
Aug. 18	601,788
Aug. 11	603,968
Aug. 4	612,660
July 28	610,042
July 21	616,040
July 14	602,778
July 7	520,741
June 30	646,003
June 23	623,322
June 16	618,881
June 9	616,768
June 2	579,656

July Building Awards Show Slight Loss

	Square Feet	
	1935	1934
January	11,245,100	9,568,700
February	9,670,300	8,176,300
March	15,873,100	14,788,900
April	19,981,100	14,207,100
May	22,276,200	14,664,400
June	22,878,800	13,986,500
July	21,565,900	13,250,000
August		14,259,000
September		12,510,300
October		15,098,100
November		12,780,800
December		9,193,300



Industrial Production Remains Steady in July



	1935	1934	1933
January	91	78	65
February	89	81	64
March	88	84	60
April	86	85	67
May	85	86	77
June	86	84	91
July	86	75	100
August	....	73	91
September	....	71	84
October	....	73	77
November	....	74	73
December	....	86	75

July Automobile Output Continues Decline

	1935	1934
January	303,372	162,570
February	358,658	238,827
March	451,809	352,614
April	501,837	371,338
May	385,486	350,616
June	377,065	320,382
July	350,118	276,047
August	....	244,715
September	....	175,586
October	....	135,771
November	....	85,179
December	....	156,356

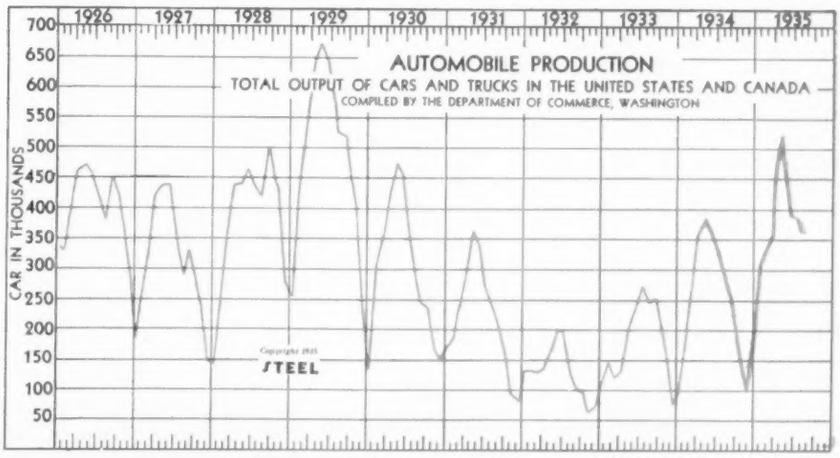


Fig. 1 — Bloom yard at a mid-western steel plant where oxy-acetylene torches are employed for deseaming semi-finished material

TORCH DESEAMING

Removes Surface Defects from Billets, Blooms And Slabs at Rate of 30 to 50 Feet Per Minute

BY W. S. FARR
Steel Mill Specialist
Air Reduction Sales Co.

USE of deseaming or scarfing tips for rapid removal of surface steel containing defects on billets, blooms and slabs has increased during the past few years. Savings in time and money are realized by plants employing this oxy-acetylene operation as it is eight to ten times faster than pneumatic chipping. Where a small amount of chipping or deseaming is required to condition the steel, the costs by either method will not be far apart. The value of torch deseaming to the user increases as the amount of work required per ton of steel conditioned increases.

Process Shows Up Defects

The latest Airco-DB oxyacetylene deseaming equipment and improved technique make possible cuts that are satisfactory to the man in the hot mill who rolls the conditioned steel. The same satisfactory work can be produced on low-carbon steels, from 0.07 to 0.08 per cent carbon, as on those in the higher carbon ranges. The deseaming cuts shown in Fig. 3 are typical, and can be equaled by an experienced operator in regular production work.

Torch deseaming insures the removal of all defects or scrap. Imperfections in the surface show up while the cut is in progress. The operator through the dark glasses can see defects as irregularities in the cutting oxygen stream. Even the fine cracks show up while deseaming is under way. The larger cracks, scabs and other imperfections are more readily visible. Contrary to what generally is believed to take place, torch deseaming actually opens any small cracks that remain after a pass with the torch. In conditioning steels where all defects must be removed, torch deseaming can be depended upon to show definitely that all are removed within the area conditioned. The cracks are opened by the heat generated when the iron and oxygen burn during the cut. The relatively large piece of steel being deseamed and the speed of cutting eliminate the possibility of welding the cracks or seams. One steel maker has had such good results with torch deseaming that all steel on a certain product is skinned on all four sides before final rolling.

Steel Is Not Harmed

The effect of deseaming on the steel is in no way harmful. The speed of cutting — 30 to 50 feet per minute — precludes the possibility of decarburization. The surface of the cut is left with a light flaky oxide. A few strokes with a wire-brush leaves the cut bright and clean. The steel on the surface of the cut is found to be good and clean, free from any decarburization or surface cracks which might give trouble later on. Any change in grain structure due to the local heating during the cut will be eliminated when the steel is reheated.

Deseaming Differs from Cutting

The deseaming technique differs from that of ordinary cutting. In selecting operators for deseaming, it is usually better to take men who are familiar with surface defects in steel rather than men who have had previous oxyacetylene cutting experience. The few simple practices to follow for satisfactory work are not hard to acquire, and after a few days' experience the average operator should be able to produce good results.

Preheating for the start of this type of cutting is necessary as in ordinary cutting. At least three of eight preheat holes should be in direct contact with the surface. The space heated should be as wide as practicable for wide starts are essential to good work. This especially is true where adjacent cuts are necessary for any sharp, high ridges likely to lap over in rolling are eliminated.

When the steel surface in the im-

mediate area of the tip has reached the sweating point the torch is drawn back and the tip angle reduced to about 20 degrees with the horizontal. If the tip angle simply is reduced without drawing the torch back, the cutting oxygen stream will not impinge on the hot steel when the cutting valve is opened, but will pass beyond it. Another reason for drawing the torch back is to have it in forward motion when the cut is started to prevent gouging at the start instead of making the gradual starts shown in Fig. 3. After the torch actually is moving forward, open the cutting oxygen valve wide. A little practice will soon bring to the operator the necessary skill for this part of the operation.

Light, Fast Cuts Are Best

After the cut is under way, the tip should be held at about the same angle although the quality of cut desired will be the controlling factor. The smaller the angle between tip and steel surface, the better quality cuts will be produced. Where deep defects must be removed, the angle may be increased, but the speed will be slower. In general, however, it is better to make light, fast cuts, and reinspect after each series, unless the operator is certain additional cuts are necessary to clean out all the defects. Frequent reinspection will prevent unnecessary removal of good steel. The smoother and cleaner the work is kept at each series of cuts, the easier it is to make the next series if they are necessary.

Where adjacent cuts are required to remove defects, the first should be made nearest the operator. Each succeeding cut is made on the far side of previous cut and by holding the tip end slightly to the right of the direction of travel, the oxide will be thrown on the uncut steel. Each succeeding cut removes the oxide from the last cut. The oxide left on the surface is easily removed with a wire brush, leaving the surface as shown in Fig. 3.

Relation of Width to Depth of Cut

On certain classes of steel, cracks frequently go deeper than one pass will remove. Care should be exercised that the cut is flared properly to prevent lapping in rolling. The width of any cut should be not less than four times the depth with the sides gradually sloping from the bottom of the cut to the surface of the steel.

Results produced by the correct deseaming technique, respectively, in Fig. 3. The cuts were made with the steel horizontal. Four cuts were made on the piece shown in Fig. 3, and are number 1 to 4, reading from bottom to top. The first cut was made from right to left. The second, third, and fourth were made in the same manner. The last or fourth cut shows how the oxygen stream was directed to throw the oxide in the path of the next cut. At first thought this may appear to be a disadvantage but when a comparison is made between the work produced, it is easier to see which will be preferred by the customer. On billets little or no trouble is encountered in cutting because of the oxide thrown on the uncut steel. Where large areas must be conditioned as on slabs, a hand scraper can be used when necessary between cuts.

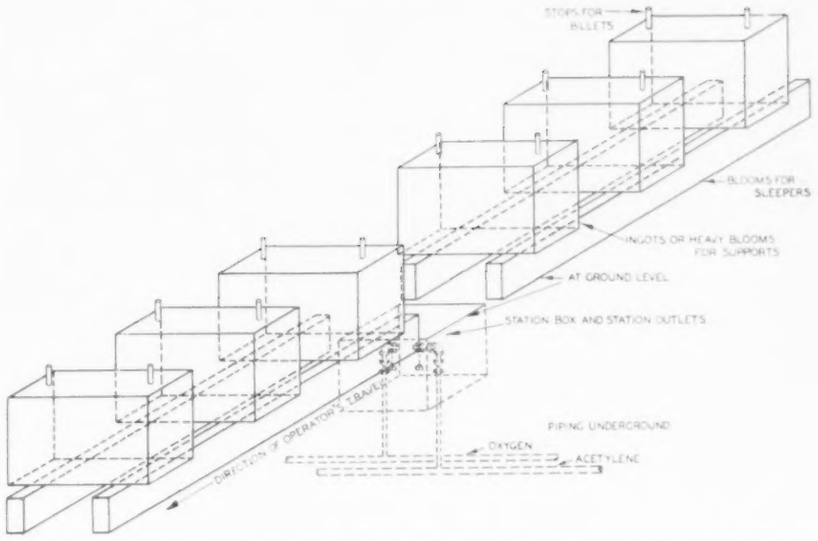


Fig. 2—Schematic layout of beds for deseaming billets. The beds must suit the billets to be handled and the space available

Proper crane facilities for handling steel to and from the beds are necessary to take full advantage of the time-saving possibilities of deseaming. Beds to support the steel at the proper elevation make for better operating efficiency, especially with new operators. The steel should be supported with the top surface about waist high. In this position, the operator has better control over the torch and tip.

The following set-up for deseaming billets is in successful operation and with the necessary modification to meet local conditions, should prove satisfactory in other mills. The general construction of the beds is shown in Fig. 1. Each operator has two beds on which to work. Connections for oxygen and acetylene, when working from pipe lines, are located in a box between the ends of the beds.

The beds can be constructed from off-analysis ingots laid on bloom sleepers with the surface of the blooms supporting the billets level. Usually three supports for each bed will be sufficient to support the bil-

Hourly Flows of Oxygen and Acetylene for Deseaming

Cutting Oxygen in Cubic Feet per Hour Regulator Pressures, Pounds per Square Inch

Tip No.	30	40	50	60	70	80	90	100	110	120
2	590	720	850	990	1120	1250	1385	1520	1655	1785
3	600	735	870	1005	1140	1275	1410	1550	1680	1820

Preheating Oxygen and Acetylene in Cubic Feet per Hour Regulator Pressures, Pounds per Square Inch

Style 48, Six No. 54 Drill Preheat Holes

Tip No.		5	6	7	8	9	10	11	12	13	14	15
2	Acetylene	66	74	81	88	95	101	107	112	118	124	129
	Oxygen	79	89	97	105	114	121	129	134	142	150	155

Style 48, Six No. 53 Drill Preheat Holes

3	Acetylene	73	81	89	97	104	111	118	125	132	138	145
	Oxygen	88	97	107	116	125	133	142	150	157	166	174

Eight No. 53 Drill Preheat Holes

3	Acetylene	97	108	119	129	139	148	157	167	176	184	193
	Oxygen	117	130	143	155	167	178	189	201	211	221	232

Eight No. 56 Drill Preheat Holes

3	Acetylene	72	79	87	95	103	111	119	127	135	143	151
	Oxygen	87	95	105	114	124	133	143	153	162	172	181

lets with a minimum of sag. The walkway alongside the beds must be kept clear of all obstructions so the operator can walk the full length of the billet with no interference.

The width of the beds should be about 4 to 4½ feet on the surface where the billets will lie. About half of this width is for the billets being worked on, and the other half provides a place for the unworked billets. A substantial though short stop about 2 inches high must be put on each support at the outside edge to keep billets from falling off the bed when turned.

A lift of billets is landed on the far side of each bed. The helper, working with the operator, rolls into position six or eight billets, depending on their size. The inspector marks out the defects and the operator then can start his work. The usual practice is for the operator to start at the end nearest the gas connections and work to the other end. Where necessary, cuts can be made the full length of the billet without stopping. Work is started on the billets farthest from the operator so that the effect of heat on him from any slag left on the surface will be minimized.

Keeping Billets Straight by Turning

While the operator is working on the first bed, the laying out and inspection of billets is carried out on the other bed. The operator goes from one bed to another, deseaming the billets ready for him. In the meantime, the helper cleans the slag from the billets and turns them twice. This brings the opposite side up for deseaming, and any bending caused by heating will be taken out by the work done on the upturned side. The billet is then turned so the next side is up. After deseaming the third side, the billet is turned twice, bringing up the last surface to be worked. Upon completion of the last side, the billet will be sufficiently straight to cause no trouble in the reheating furnace.

Conditions do not always permit the steel to be worked as described. With certain classes of blooms and heavy slabs for plates, it is more desirable to lay the steel out as shown in Fig. 2. Here the operator can walk between the blooms. Operators working in this position soon become expert, producing satisfactory cuts.

The oxygen and acetylene supply for most economical operation must be supplied from pipe lines supplied by oxygen manifolds and acetylene generators respectively. In some cases where operations may be irregular, cylinder acetylene may be used. Three-cylinder portable acetylene manifolds for these few cases will save time and reduce acetylene costs.

Oxygen hose and hose connections should be not less than ⅜-inch, with glands to suit. Large hose, using glands with small holes, defeats its purpose. Care should be taken to keep hose splices to a minimum, and where any are necessary they must offer little restriction to the flow of oxygen. Regulators must be of ample capacity to meet the sudden demand for relatively high flows. For oxygen, the Style 8490 is recommended, and for acetylene, the Style 8402. Acetylene hose should be $\frac{5}{16}$-inch with suitable glands.

The cost of torch deseaming per ton of steel will vary depending upon the size of the billet bar or bloom and the class of conditioning to be done. To give any figures on costs would be impossible except in specific cases where the steels worked on are identical in every respect. Even then the torch frequently will show up de-

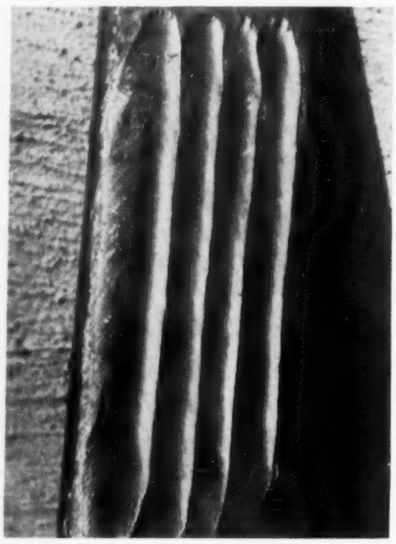


Fig. 3—Work produced by correct technique. Note smooth gradual starts and absence of oxides

fects, and in removing them more work would have been done than in pneumatic chipping. The final answer is given in the yield of finished steel from the hot mill, and where it can be raised this is much in favor of torch deseaming. As previously stated, the operators can be certain that no scrap or defects are hidden under any area deseamed properly, and with all defects out there should be no rejections at inspection for defects left in when conditioning.

The accompanying table gives the hourly flows of oxygen and acetylene for the tips used in deseaming with the Style 4000 touch. Three tips are now in use, one is the Style 48 with six preheat holes, the other two have eight preheat holes with the cutting orifice for corresponding numbers the same in all cases. The last two tips are experimental in preheat only but both are producing good work. Their only difference is in the degree of preheat.

In general, the best operating range is from 60 to 90 pounds per square inch oxygen pressures. Acetylene pressures are from 8 to 10 pounds. Specific conditions govern and it may be found desirable to vary the amount of preheat. The light and heavy preheat 8-hole deseaming tips were developed to fill the need for variation in preheat. When the work is almost all skinning and the start is made on the end, less preheat will be required than when working on the middle of a large slab with resulting acetylene economies.

Use Pressures of 80 to 90 Pounds

The oxygen pressure should be kept low until the operator becomes experienced and then it can be raised gradually. Good smooth starts are hard to get with high pressures unless the operator has had considerable experience. In some cases, it may be desirable to go below 60 pounds while learning. Operators on skinning work have boosted the pressure gradually until they are now using 125 pounds pressure. Careful checks have failed to show any increase in operating costs. Operators using high pressures find it difficult to control the cutting oxygen stream, thereby gouging deep starting holes and making a sloppy start.

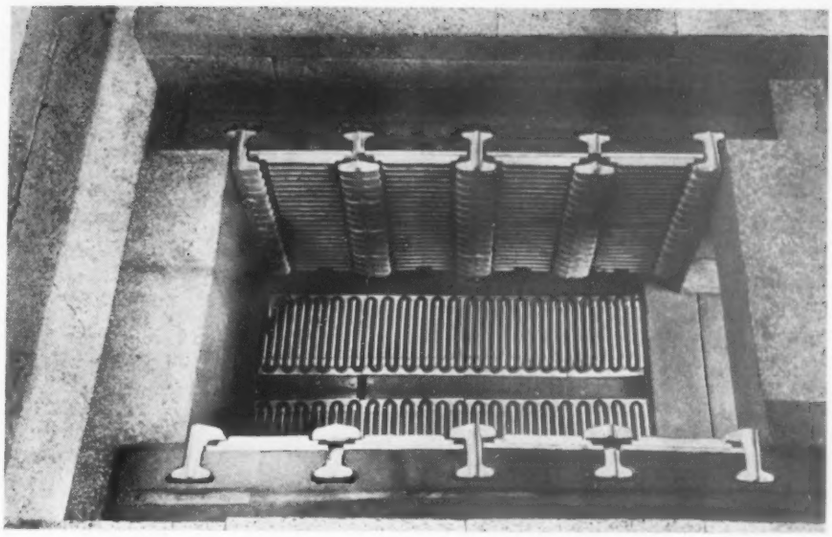
In general, the tendency should be toward pressures of about 80 to 90 pounds. Faster cutting is possible with no increase in oxygen consumption per pound of metal removed, provided the operator is in a position to "crowd" the torch.

Pressure Piping Code Is Available in Printed Form

Demand for a nationally applicable safety code for pressure piping, acceptable to manufacturers, state safety and inspection agencies, insurance companies, and industrial engineers, has now culminated in the final approval of the "American Standard Code for Pressure Piping," by the American Standards association.

The code is subdivided into sections, each dealing with a particular kind of piping. Power piping, gas and air piping, oil piping, and district heating piping are covered. In addition to these subdivisions, provision was made for two sections of a general nature applying to all services, which deal with available materials specifications and fabrication details.

Copies of the code in published form, a 164-page book, can be obtained for $1.00 per copy by addressing either the American Society of Mechanical Engineers, 29 West Thirty-ninth street, New York, or the American Standards association at the same address.



Interior of 20-kilowatt, box furnace, with roof removed and floor missing, showing insulation construction and the heating element made from Smith No. 10 chromium-iron-aluminum alloy

HEAT RESISTING ALLOY

Is Announced; It Permits Metallic Resistors For Heating and Melting to 2400 Degrees Fahr.

A NEW heat resisting alloy of chromium - iron - aluminum type, known as Smith No. 10 has been developed by A. O. Smith Corp., Milwaukee. Rights and patents relating to it have been acquired by Hevi Duty Electric Co., that city. The new alloy now is being used in the new line of heat treating furnaces for industrial and laboratory use manufactured by the Hevi Duty company, making available electric heat with metallic resistors for operations to 2400 degrees Fahr.

Arrangements now are under way for commercial production of the new alloy in the form of resistors of various kinds. It may be rolled into wire from the ingot and then swaged to the gage desirable for electric furnace requirements. With this wire it is readily possible to wind coils or make reverse bands and other shapes of heating elements. The new alloy also may be cast into resistors or furnace parts of any desired form.

Higher Voltages Permitted

Practical tests have demonstrated that furnaces wound with the new alloy safely may be operated at 2400 degrees Fahr. (1315 degrees Cent.) and higher. These findings also were confirmed by accurate life tests indicating commercial life at 2300 to 2400 degrees Fahr. (1260 to 1315 degrees Cent.).

Electrical resistance of Smith alloy No. 10 is about 1000 ohms per circular mil foot. After passing through a maximum at about 1700 degrees Fahr. (925 degrees Cent.), its resistance falls gradually and at 2300 degrees Fahr. (1260 degrees Cent.) it is about 10 per cent and at about 2600 degrees Fahr. (1425 degrees Cent.) it is about 7 per cent above the resistance at room temperature. These temperatures are black body temperatures of the wire in air. This exceptionally high resistance permits the use of higher voltages or larger heating elements or both.

Melts at 2830 Degrees Fahr.

Melting point of the new alloy was studied by heating samples in an induction furnace in a high vacuum and under proper conditions for black body radiation. By determining the temperature to which samples must be heated to start fusion it was found the new alloy begins to melt at 2830 degrees Fahr. (1555 degrees Cent.), as compared with 2775 degrees Fahr. (1525 degrees Cent.) for mild steel. This high fusion point permits exceptionally heavy loading of the heating element to generate a large amount of heat in a short time without fusing the center. Combined with this characteristic is the fact that the density of the new alloy is unusually high for heat resisting alloys, being 6.9 grams per cubic centimeter.

The high temperatures at which the heating element is designed to operate cause a certain amount of growth. This must be permitted to occur freely to avoid buckling and an allowance of about ¼-inch free space per foot must be made. It expands about 0.3-inch per foot when heated to 2400 degrees Fahr. (1315 degrees Cent.) and the expansion and contraction of the element must be allowed to occur without restriction. The approximate expansion coefficient is 21.6 x 10-6 per degrees Cent. or 12.0 x 10-6 per degree Fahr. between room temperature and 2400 degrees Fahr. At times the operating temperature of the element may be so high that sagging would be produced were means not provided to support the weight. All three of these characteristics and their effects are accentuated by the high operating temperatures.

Protective Film Formed

It is usual to operate a heating element under oxidizing conditions. It is pointed out by its developers that the protective alumina film that forms on the new alloy is highly resistant to the penetration of oxygen and that it is largely, though not entirely, due to the efficiency of this protection that the new alloy owes its excellent performance at high operating temperatures.

While the effects of other atmospheres have not been investigated thoroughly, the Smith company believes it reasonable to assume that

the new alloy will function satisfactorily under other conditions. For example, its rate of carbon absorption in a carburizing atmosphere is very low. At the same time the new alloy is said to be resistant to sulphur.

The new alloy can be welded to itself or to other leads of nickel-chromium alloy by using wire as a filler rod. An ordinary oxyacetylene flame can be used with a flux of ½ KCl and ½ NaF. A carburizing flame should be avoided. When properly made such joints perform satisfactorily in a heating element. Parts made of this alloy are sensitive to grinding and should not be shaped by this method. No particular difficulty is had in machining the new alloy, particularly if a milling cutter can be used, but it is better to avoid machining as well as grinding if possible.

Applications of the New Alloy

Laboratory furnaces wound with the new alloy, it is stated, are simple in construction, control and manipulation and are able to operate over a wide range of temperature and permit flexibility to an extraordinary degree. They are recommended for use in such work as grain growth studies and determinations of the carbon content of steel. In the field of heat treating they are recommended for treatments requiring higher temperatures such as the Strauss treatment for stainless steel and the hardening of high speed steel. They are recommended for heating with less scale formation and decarburization forgings, blanks and billets to be pierced; the Hevi Duty company also is studying the possibilities of heating in controlled atmospheres in furnaces wound with the new resistors. The company also recommends the use of the new alloy as heating elements in general purpose, copper brazing, ceramic and melting furnaces, and also in electric cooking ranges and other units in which heating elements are required.

In the field of melting, the new alloy is recommended for melting all metals and alloys whose melting points do not lie above 2300 degrees Fahr. A melting furnace with the new resistors, says the company, requires a minimum of electrical equipment and provides maximum simplicity in construction and operation. Metals and alloys with higher melting points, such as cast iron, brass or bronze must be melted in other types of furnaces.

Rotary Cutter Has Liquid Seals and Saves Power by Using Roller Bearings

AN INTERESTING new patented rotary cutter has been developed by Ball & Jewell, 22-28 Franklin street, Brooklyn, N. Y. For years this company sought to design a cutter in which water would be kept out of the bearings when wet grinding inflammable materials and in which oil from the bearings would be prevented from entering the cutting chamber and contaminating food or other products being reduced by dry cutting. After many experiments, the company, in the new cutter, has hit upon a design that accomplishes this object.

Details of Construction

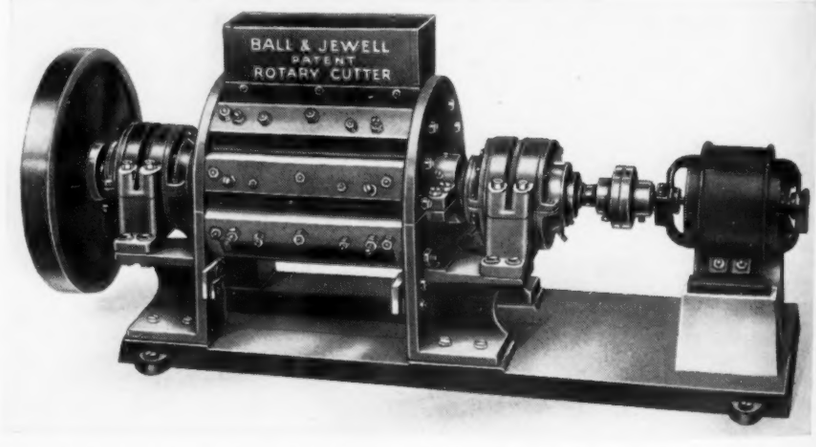
The cutter, which revolves in a circular case, consists of 3 to 8 fly knives, fastened to knife heads mounted on a steel shaft. In the same circular case are six bed or stationary knives, 3 on each side. All these knives, both fly and stationary, are fastened securely by special alloy steel bolts. The end castings, bolted to the circular case casting, act as supports for outboard bearings and also form the sides of the circular case itself. The end castings are provided with adjustable seals. They also are provided with grooves containing drain holes so that, in case a careless operator fails to adjust the seals, any water that might get past these seals runs into the grooves and out through the drain holes. Further, should the drain holes became filled with dirt and the water continue along the shaft, it would come in contact with flingers on the roller bearings housings and be thrown off. This arrangement of the end seals makes it imposible for any water to get into the bearings or for any oil to get into the cutting chamber.

Three other features sought by the company also are included in the new cutter. As a result of employing roller bearings the machine uses 25 to 30 per cent less power than the previous machine not so equipped, and at the same time the capacity has been increased 20 to 30 per cent. Oil consumption is negligible and during a test run of six weeks no oil could be added to that put in the bearings at the start of the run. Another feature is that the new machine has the great advantage of keeping the knives in proper alignment when once they are set, thus eliminating the former necessity of allowing for bearing wear.

Made in Various Sizes

Manufactured in sizes ranging in weight from 500 to 12,000 pounds, the new unit may be had either for belt or direct motor drive. The body is of high grade gray iron. The shaft is of turned and ground steel ranging from 2 to 4 15/16 inches in diameter and from 3 to 8 feet long depending on the size of the machine. The fly wheel used on the direct motor driven machine is a solid, semisteel casting. Pressed steel split pulleys are used on the belt driven type machine. Knives are made with special alloy soft steel backing, with high speed steel inlays. Both the fly and bed knives are of the laid type, welded under hydraulic pressure. Perforated steel plates, with holes of any desired size, form the bottom of the cutter.

The new cutter is adapted to reduce to uniform fineness such materials as paper, pulp, rubber, cork, rags, roots, herbs, spices, barks, bones, beef scrap, tobacco stems, leaves, shavings, sticks, blocks, leather, chipped log wood, hard fiber, asbestos scrap, grain of all kinds for chick food, cheese, cellophane, celluloid and many others.



Steel and castings are used in construction of this improved rotary cutter. Knives are of the laid type and are of soft steel backing with high speed steel inlays, welded together under hydraulic pressure

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Foundrymen Seek New Light On Old Technical Problems

PERUSAL of the technical program of the thirty-ninth annual convention of the American Foundrymen's association, held at Hotel Royal York in Toronto, Aug. 20-23, details of which were reported in part on pages 14, 15, 31, 32 and 43 of last week's issue, reveals no new topics of discussion. However, those members and guests who followed the program carefully noticed that in many instances the approach to the solution of old problems was directed into new channels.

For instance, the traditional discussion of problems in steel foundry practice usually has revolved about the use of chills, gates, risers, temperature of metal, carbon content. In the Toronto meeting, the discussion veered toward radiography and welding. In the same way, the exchange of opinions on cost systems, apprentice training, industrial health hazards, sand research, etc., was marked by frequent reference to new methods of attacking problems which have challenged the industry for years.

Steel Castings

IN THE session on steel foundry practice, held Friday morning with John Howe Hall, Taylor Wharton Iron & Steel Co., High Bridge, N. J., presiding, statements were made and accepted without challenge, which, if uttered two or three years ago, would have been considered radical.

J. M. Sampson, General Electric Co., Schenectady, N. Y., presented an outstanding paper on the fabrication of cast steel to rolled steel stock. He showed the results of extensive tensile, bending, shear and fatigue tests on specimens of cast steel welded to ordinary rolled steel plate. When the data incorporated in this paper becomes generally available in printed form, it will constitute valuable information for the guidance of foundrymen and welders who see the opportunity for greater co-operation between the arts of casting and welding.

Welding Cast to Rolled Steel

Mr. Sampson showed illustrations of jobs which originally had been cast complete; then had been fabricated from castings, plates and bars by welding; and finally—as a result of thorough investigation—had been redesigned to use cast and rolled steel in the proportion which brings out the advantages of both materials most effectively.

In the ensuing discussion, to which P. E. McKinney, Bethlehem Steel Co., Bethlehem, Pa., was an important contributor, the thought was expressed that the combination of welded steel and cast steel parts by welding offers unlimited opportunities to steel foundrymen.

Welding Defective Castings

Mr. McKinney declared that the time has passed when the foundryman can say that welding is not a serious competitor of castings. Welding castings to rolled steel, in his opinion, is a "real step forward." To which observations, Mr. Sampson responded that "rather than see work go away to welders, foundrymen should secure good welding facilities and go into the business of providing customers with the proper combination of cast steel and rolled steel, fabricated by welding, which afford greatest service and economy."

A paper on X-ray and welding as aids to the production of quality steel castings, by C. M. Underwood and E. J. Ash, Naval Gun factory, Washington, was presented by Mr. Ash. He described a portable X-ray machine employed by the navy in the investigation of castings and explained how defects thus discovered, after careful cleaning and other preparation, are repaired by welding.

In the discussion which followed, the old question of carbon content arose. For welding carbon in the twenties is preferred, but from the standpoint of the foundryman, carbon of 0.30 per cent or more is desirable. The consensus of opinion seemed to be that under modern advances in both casting and welding, an agreeable compromise on carbon should not be difficult.

Recommends Use of Negative Prints

Charles W. Biggs, U. S. naval research laboratory, raised the question as to whether positive prints of radiographs should be used in illustrating casting defects. He recommended the use of the negative print, since that is similar to the films used on the foundry floor. Mr. Ash, in replying to this comment, referred to the fact that in reproducing radiographs for publication, the double reproduction involved in presenting the negative entails a considerable loss in detail in the print.

All who discussed the use of X-rays considered it an invaluable aid in the production of castings, particularly when coupled with intelligent salvaging accomplished by good welding technique.

At a session on steel castings Thursday morning, Charles W. Briggs, U. S. navy research laboratory, coauthor with Roy A. Gezelius of the same laboratory, presented a paper on "Studies on Solidification and Contraction in Steel Castings." Characteristics of the mold determine the length of time it requires before solidification is complete, Mr. Briggs stated. As the rate of cooling decreases the time required for the steel to pass through the freezing range increases and the velocity of solidification is altered.

The initial rate of skin formation is decreased by pouring the casting with superheated steel. The rate of solidification of a metal in a mold depends to a certain extent upon the temperature of the mold prior to pouring.

The speaker declared that the rate of skin formation increases as the volume of the steel casting decreases and the greater the surface area of the steel casting the faster is the rate of skin formation. The factor of solidification is a constant; that is, at any definite time after pouring the volume of steel solidified per square inch of mold surface is the same. Variations in the ordinarily used molding materials results in little more than a perceptible change in the velocity of solidification. Moreover, the degree of superheat modifies the rate at which the skin forms.

Discusses Temperature Gradients

A paper entitled "The Influence of Temperature Gradients in the Production of Steel Castings," by George Batty, Drexel Hill, Pa., was abstracted by John Howe Hall in the absence of the author. The bottom-gating of a casting inevitably produces an adverse temperature gradient in the metal, the top of the casting being coolest and the bottom being hottest at the moment the metal proper is filled. Horn-gating into the bottom of a side, or elbow, riser has distinct advantages over either the straight or the tangential ingate, according to the author.

Recommendations of the A. F. A. committee on chemical classification of foundry steels, which have been under study for the past two years, were presented in printed and final form.

Steel foundrymen who attended the Thursday luncheon stressed the importance of standardizing methods for testing steel castings. Consensus of opinion seemed to be that a committee should be organized to develop standard tests. The thought also was advanced that a committee should be formed to study radiogra-

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phy of steel castings and to advise foundrymen of the proper technique.

Discussion was opened by the chairman of the session, A. W. Gregg, Farrel Cheek Steel Foundry Co., Sandusky, O. Problems associated with the cooling of molding sand were discussed at length. One executive pointed out that as long as the temperature of the sand at his plant was kept below 100 degrees Fahr. no trouble was encountered but as soon as the temperature increased to around 115 to 120 degrees then difficulty was experienced. The method used at this plant involved the shaking out in two separate piles and allowing one to cool while drawing the supply from the other.

Molding Sand Is Cooled

One speaker mentioned a plan followed at a plant in Switzerland for cooling the sand. The material is returned from the shakeout floor on a steel belt, 24 inches wide, upon which air impinges. At one American plant the hot sand is conveyed to three storage tanks and the practice is to alternate the three batches

Punchings from copper strip added to molding sand affords a quick conduction of heat away from the casting but the copper is difficult to reclaim after the shakeout according to a foundryman. In order to use magnetic separation his shop is now trying stainless steel punchings. Another member told of using machine shop chips in the proportion of half chips and half sand. However, he stated, the steel with its sharp edges becomes embedded in the pattern and difficuty is experienced in removing the core.

Gray Iron

CONVERTER and cupola duplexing was discussed by Don Reese Whiting Corp., Harvey, Ill., at the Thursday morning shop course on cast iron. J. A. Sweeney, Florence Pipe Foundry & Machine Co., Florence, N. J., presided. The speaker referred to the growing importance of cast iron compositions differing widely from compositions formerly accepted as orthodox. A noticeable tendency is toward the production of irons low in total carbon and possessing higher tensile strength.

A large addition of steel scrap in the charge is the principal factor in securing these results. While the manipulation of the heat is quite feasible in the electric furnace, certain limiting factors prevent the same ease of manipulation in the cupola where the entire charge is melted and where the total low carbon content of the metal is changed by the absorption of carbon from the fuel. This difficulty is overcome, the speaker stated, by the duplexing process where a certain amount of the charge is treated in a converter and then added to the remainder of the metal melted in the ordinary manner.

One of the advantages of the process is the ease of operation and the extreme flexibility of the method. The final metal in the ladle may be varied from an addition of 10 per cent steel to a possible maximum of 90 per cent. In a fairly common mixture containing 45 per cent steel and 55 per cent iron, the carbon content will vary from 1.40 to 1.60 per cent, silicon 1.30 per cent, manganese from 0.60 to 0.70 per cent, with correspondingly low percentages of sulphur and phosphorus.

The final session on cast iron was held Friday morning under the direction of Walter Seelbach, Forest City Foundries Co., Cleveland, chairman, and R. F. Harrington, Hunt-Spiller Mfg. Co., South Boston, Mass., vice chairman. A paper by O. W. Ellis, J. R. Gordon, and G. S. Farnham, Ontario Research foundation, Toronto, on "Wear Resistance of White Cast Iron," was presented by Mr. Gordon. It described some results obtained by testing cast white iron balls of different compositions in ball mills with ¼-inch silicon carbide abrasive grain as the abrading agent.

Foreign Data Are Received

W. H. Spencer, Sealed Power Corp., Muskegon, Mich., gave the report of the international committee of tests. He stated that specifications and methods of tests had been received from a number of European countries including Switzerland, Germany, Czecho-Slovakia, Spain, Italy, Holland, Belgium, etc. and that in general the highest tensile strength mentioned was 37,000 pounds per square inch; anything higher being classified as above that figure without specific figures.

A paper, "Slags and Gases in Cupola Operation," by H. A. Dierker, Ohio State university, was read by C. H. Lorig, Battelle Memorial institute, Columbus, O. In this the author pointed out that while the mechanical details of construction and operation of the cupola are simple, the physical chemistry involved is not, and that a thorough study of the reactions taking place would prove profitable. David McLain, McLain's System Inc., Milwaukee; Fred Walls, International Nickel Co., New York; Henry Clarke, Sloss-Sheffield Steel & Iron Co., Chicago, and John Grennan, University of Michigan, Ann Arbor, Mich. discussed the paper. Mr. Walls said that in his opinion the volume as well as the composition of slag in the cupola is important, and that the gases and slag should be controlled similar to steel furnace practice.

Mr. Clarke said that volume of slag is important and that he found that a black slag gives the best results. The slag should be acid in composition, and that to insure a full slag volume, particularly in the early part of the heat, slag forming materials should be placed upon the bed. He stated that in conducting some tests that an acid slag produced a close-grain iron from a cupola, but as the limestone content was increased the iron became open-grain. Mr. Grennan pointed out that investigations conducted have indicated that irons having a large austenite grain size have higher strengths, and that acid type slags promote large austenite grains.

Malleable Cast Iron

THE market for special or pearlitic malleable irons has only been scratched. This was the belief expressed at the malleable round table on Thursday. The fact that the irons may be produced in a wide range of both strength and ductility provides an exceptionally good sales point.

In a discussion of the advantages and disadvantages of brick bottoms, one foundryman stated that he has a furnace using a brick bottom, that he has obtained between 75 and 80 heats and that the bottom still has the appearance of being in good condition. He has found it necessary to allow 1 to 1½ hours longer on the first heat when the furnace is stone cold than is necessary on other heats. This does not apply over ends when it would seem the bottoms retain sufficient heat to permit melting within the regular period of time. Another company using a brick bottom reported securing 150 heats.

Discuss Rotary-Type Furnace

The rotary powdered coal furnace for producing malleable iron was discussed at length. Heating the metal from both top and bottom is the important feature of design of the furnace. It was stated that the efficiency of the furnace is from three to four times greater than the stationary type air furnace. It was pointed out that the furnace does not require skimming. Iron is stirred automatically as the furnace turns and tapping is exceedingly simple with three tap holes provided to prevent excessive wear at any one point in the lining while the furnace is being tapped. Best results were said to have been obtained with a silica brick lining. Operating one shift with three heats a day, it was stated a lining of silica brick should give approximately three months' service. The best results have been obtained with direct firing units.

In considering continuous pouring, the statement was made that it is profitable to pour continuously where 40 tons or more of iron is melted per day. In discussing annealing cycles, one operator stated he is op-

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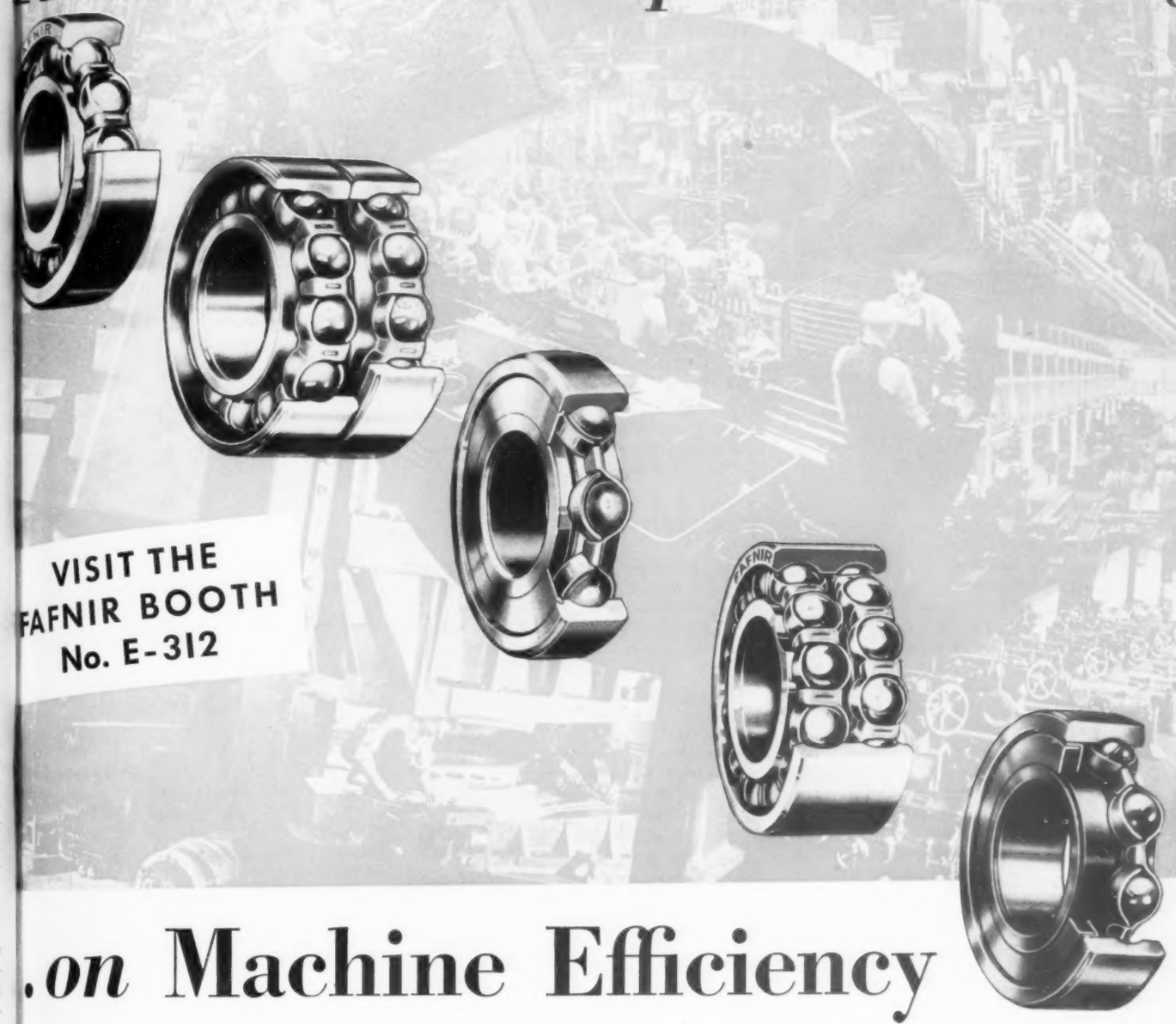

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erating a 25-ton electric furnace on a 72-hour cycle. In that furnace the castings are heated up at night to keep down the demand charge. With a regular fuel fired furnace, four cycles are completed a month, while three are obtained in a muffle type unit.

Apprenticeship

SHORTAGE of skilled labor is becoming more apparent despite the fact that many foundry employers pushed their apprenticeship programs to the limit for many years prior to the depression. In fact, a few have continued their training programs, and even increased them, throughout the past five years in the face of uncertainty and loss of revenues.

These facts were presented at the apprenticeship training session, Thursday morning, by Victor Hydar, director of personnel, Falk Corp., Milwaukee, who reviewed foundry apprenticeship for the past 15 years at his company's plant. No complicated interviewing system or any so-called aptitude tests or examinations are employed, he stated. An interview is calculated to build up a correct first impression of the applicant. His general appearance, manner, bearing and personality are given their proper consideration and much emphasis is placed upon consistency between his high school curriculum and the trade he is seeking. Most important, provided the applicant is acceptable, Mr. Hydar stated, is that he first is given a trial on the company's proving ground—the Milwaukee vocational school—before he is brought into the plant.

Low Pay Rate Discourages

B. G. Parker, Youngstown Foundry & Machine Co., Youngstown, O., related the difficulty involved in keeping the boys when the starting rate is set at a low figure. The plan followed by his company is to start the apprentice at the rate paid in the district, which at present is 40 cents an hour. This keeps the boy satisfied, he stated.

W. L. Seelbach, Forest City Foundries Co., Cleveland, cited the co-operative state city employment plan and suggested that the best arrangement is to pay a rate in accordance with the conditions of the times. A good rule to follow, stated John H. Ploehn, French & Hecht Inc., Davenport, Iowa, and chairman of the session, is never to hire an apprentice over 18 years of age for those above this age invariably leave before serving their apprenticeship.

Lack of training personnel to fit them for various positions in the foundry industry was stressed by J. E. Goss, employment manager, Brown & Sharpe Mfg. Co., Providence, R. I. For many years the superstructure of many industries including the foundry industry has been built on a trembling foundation, he declared in presenting his paper on "Some Suggestions for Starting and Carrying Out a Foundry Apprenticeship System."

The need for molders is acute, he said. At least 5 per cent of skilled foundry employes normally is lost each year and in addition the industry is handicapped by men who since the depression have gone into other lines of endeavor and never will return to the foundry ranks because they have found steady employment elsewhere. During the years foundry molders have been passing out of the picture the industry has done little in the way of training men to take their place. "How else are we going to get molders unless we train them ourselves?," he asked.

Health Hazards

PROBLEMS pertaining to industrial health hazards and employer responsibility were discussed before an enthusiastic audience Wednesday evening, with President Dan M. Avey presiding.

Dr. William J. McConnell, Metropolitan Life Insurance Co., New York, presenting the first paper, stated that the maintenance of the health of workmen is a practical necessity from an economic standpoint alone.

He stressed the fact that the essential basis of health control in industry is the physical examination of workers. Selection of workers must be based on a thorough physical examination by competent authorities, and periodic examinations must be provided as a constant check on the physical condition.

Central organization equipped to make the necessary physical examinations and capable of conducting physical surveys in the plant may furnish the best solution to this problem.

Dr. McConnell stated that in his opinion the industrial dust hazard can be controlled through the proper maintenance of equipment available to the industry.

Donald L. Cummings, Saranac Laboratories, Saranac Lake, N. Y., presented an interesting paper dealing with the medical phases of silicosis. Mr. Cummings stated that although a foundry must always be considered a dusty industry, the nature of its operations are such as to induce for the most part only a modified silicosis. Both mortality studies and clinical examinations of foundry workers fail to disclose the type hazard associated with pure silica exposure. Many men in advanced age group, who have spent their entire lives working in the foundry industry are still capable workmen, suffering from no occupational disability, although most of them will be found to have some degree of pulmonary fibrosis.

Disabilities Are Investigated

According to Mr. Cummings, workmen who are disabled by an occupational fibrosis contracted in the foundry generally are those who exhibit evidence of concurrent pulmonary infection or other injury. Information gathered from field studies made in many parts of the world indicate that a normal man may work for many years in air containing pure crystalline silica dust without impairing his health, provided the concentration does not exceed five million particles per cubic foot of air, as determined by the standard method used in the United States.

In discussing the subject of plant housekeeping, a number of those present told of some of the steps taken in their plant to provide greater safety and health of employes. E. O. Jones, National Founders society, Chicago, discussed laws pending in several states, and pointed to some of the simple things which can be done in many plants to provide greater safety for workmen.

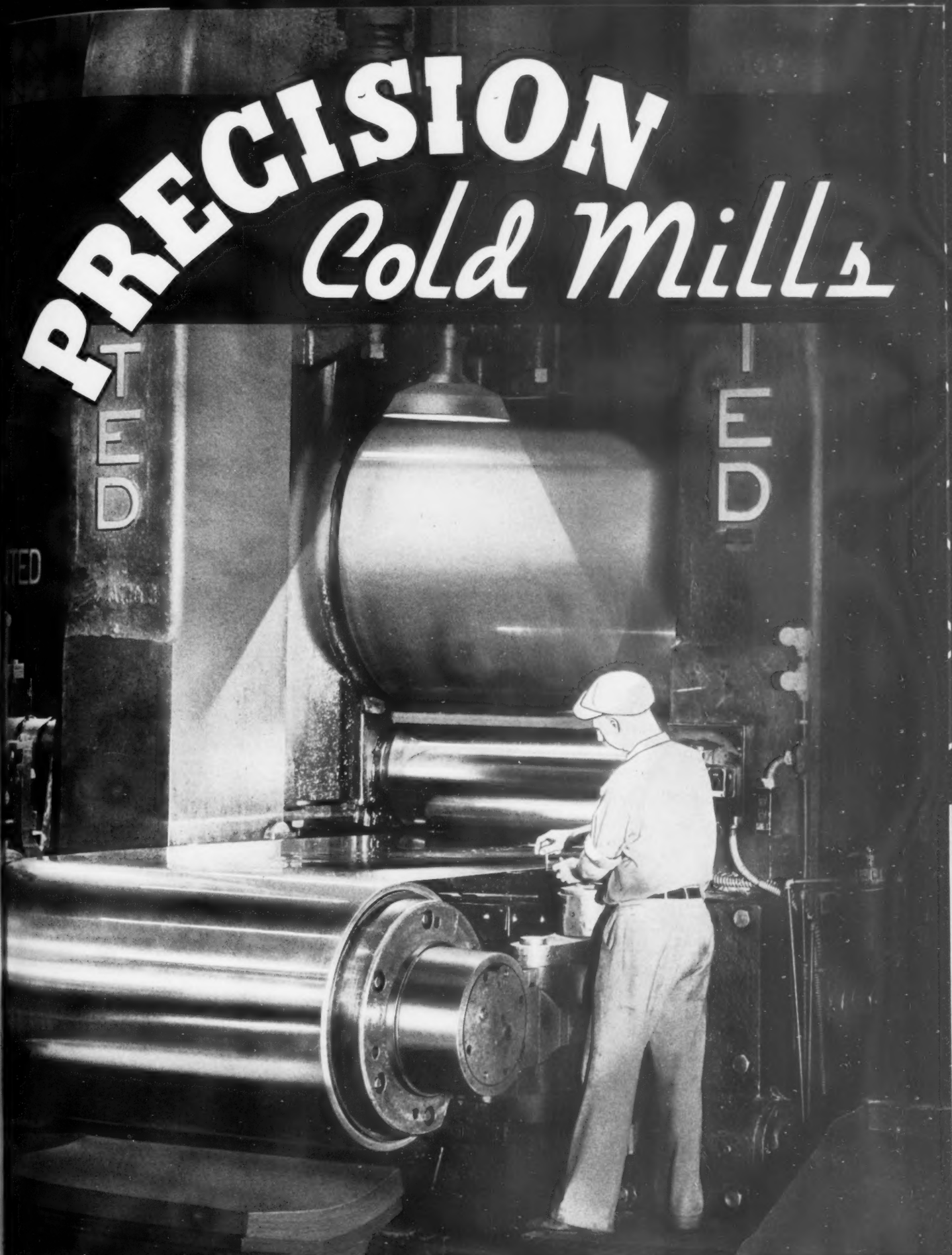
E. W. Beach, Campbell, Wyant and Cannon Foundry Co., Muskegon, Mich., presided at a session on dust control and safety codes held Friday. J. D. Leitch, Provincial department of health, Toronto, emphasized the necessity of controlling dust at the source, rather in developing methods of collecting it later. Many methods are available, but in nearly every instance an intelligent study is required to determine which method, or which style of equipment is best adapted to meet the individual problem. Certain recommendations and standards adopted by the American Society of Heating and Ventilating Engineers should be in the hands of all who are studying the subject of dust prevention or dust elimination. In conclusion Mr. Leitch described the various types of equipment at present available.

Reviews Dust Collection Methods

In a paper "Dust Collection in the Foundry" presented by S. D. Moxley, American Cast Iron Pipe Co., Birmingham, Ala., the author discussed the problem under three heads, apprehension, collection and disposal. The paper was illustrated by several slides showing typical devices for trapping dust including suction type, centrifugal, cloth filters, electrical precipitation, wet dust style and froth flotation style.

A description of cloth arrestors by J. R. Allen, International Harvester Co., Chicago, was followed by reports of A. F. A. representation on A. S. A. safety code committees.

PRECISION *Cold Mills*



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METHODS AND MATERIALS

Tantalum and Columbium, Produced by Special Methods, Have Many Uses

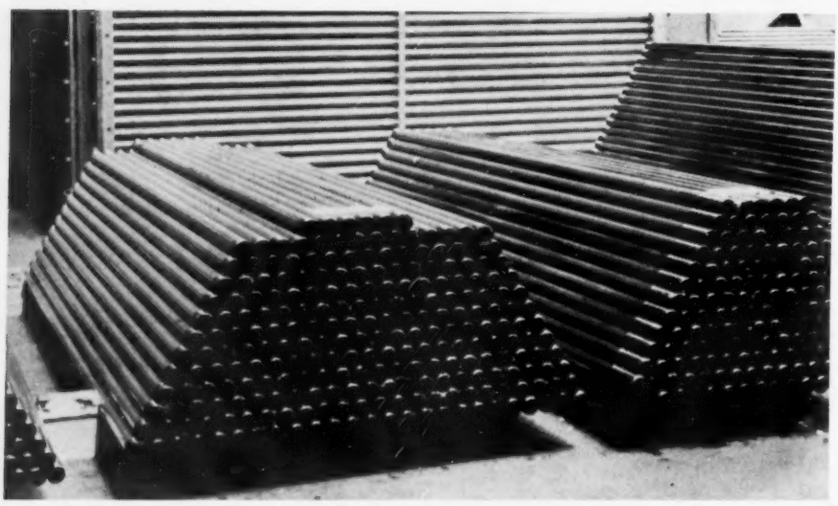
THE names columbium and tantalum refer not to metallic alloys artificially produced in a laboratory furnace, but to two chemical elements found in nature associated with each other in varying proportions and usually with more or less iron, according to C. W. Balke, director of research, Fansteel Products Co., North Chicago, Ill., before the American Chemical society in New York, April 25. Where the columbium predominates, the mineral is called columbite, and where the tantalum predominates, the mineral is known as tantalite, the name being derived from the fable of Tantalus because of the great insolubility of tantalum oxide in most solvents.

The name columbium originates in the fact that the first mineral in which it was discovered came from the United States. The mineral columbite is found in appreciable quantities in the Black hills of South Dakota, and is accumulated in connection with mining operations carried out primarily to obtain other minerals. Of all the deposits of tantalite in the world, those in western Australia are the only ones of sufficient extent to warrant mining for this mineral alone.

These metals cannot be obtained from the ore by simple metallurgical processes as is the case with the more common metals. It is necessary that they be separated from each other, and this can be accomplished only by bringing them into solution and making the separation by chemical means. This separation can be accomplished only by the use of hydrofluoric acid, an acid so corrosive that it cannot be stored in glass and which must be handled in lead or hard rubber containers.

By converting the tantalum and columbium into double fluorides with potassium, the two elements can be separated because of the difference in solubility of their two compounds. The respective metals are obtained by passing an electric current through their fused double fluorides. Under the influence of the current the elements are deposited in the form of fine crystalline metallic powders. These powders are cleaned mechanically and chemically, and then are ready for conversion into ingots.

Man-Size Bolts



TO HOLD THE ROTOR LAMINATIONS in place on the spider of one of the Boulder dam generators, 1160 of these carbon steel bolts ranging in size from 88 to 95 inches in length and 1¼ to 1½ inches in diameter are needed. Lamination segments are each 65 inches long 34 inches wide and ⅛-inch thick, the largest segment punchings ever made by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. A total of 600,000 pounds of these punchings are required for each generator

Ingots Formed by Pressure

These metals are never melted but are converted into ingots by pressing the powders in hydraulically operated steel dies. The pressed bar can be handled and is heat treated in a vacuum furnace by passing an electric current through it until its temperature approaches the melting point of the metal. In the case of tantalum, this is about twice that of cast iron.

Ingots or bars of tantalum or columbium prepared in this way are extremely ductile and can be worked into sheet or wire without the application of heat. Tantalum can be sub-

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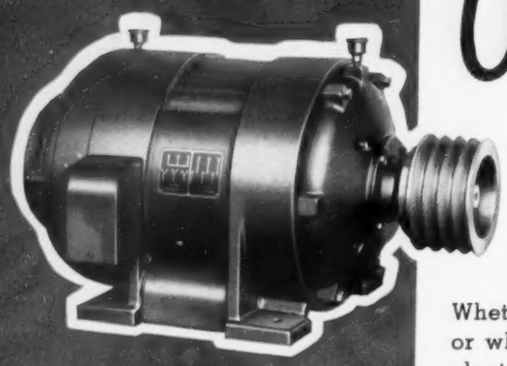
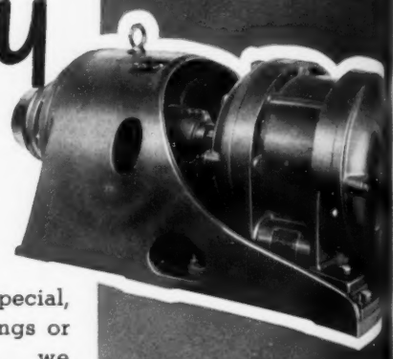
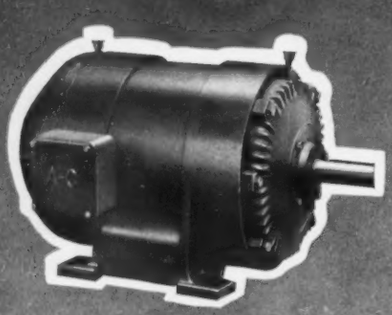
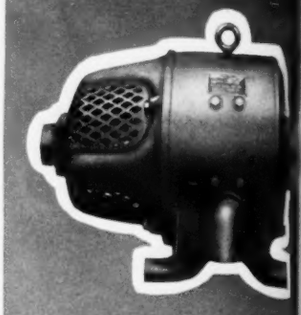
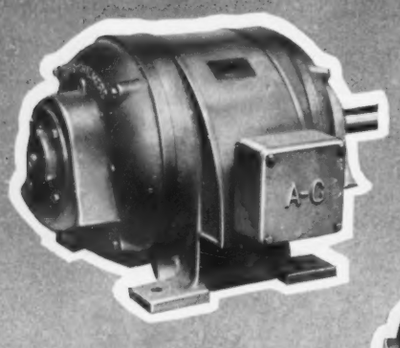


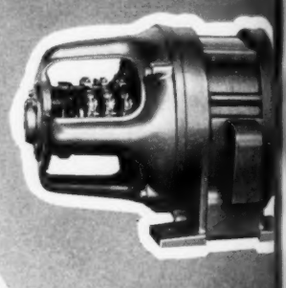


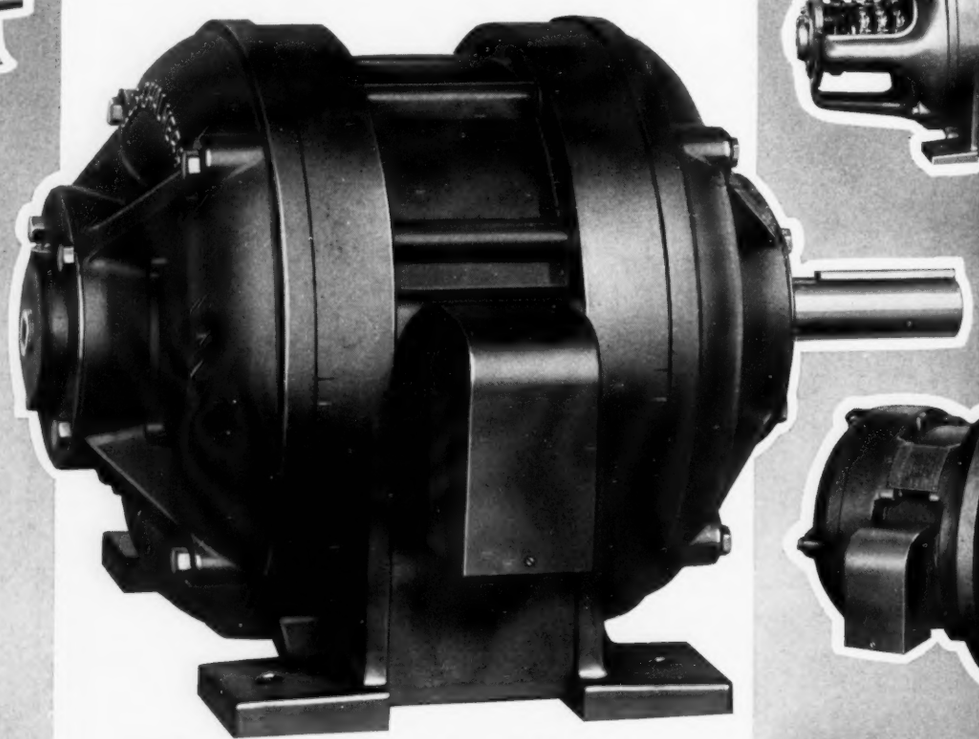
Whether your motor requirements are standard or special, or whether the desired features concern mountings or electrical characteristics makes no difference . . . we supply your motor needs and do so with performance plus. • The Allis-Chalmers plant at Norwood, Ohio, pioneered in applying individual motors to the direct driving of machine tools and in motors built into lathes and other tools. • Allis-Chalmers manufactures the most diversified line of machinery of any company on the American Continent. • All the motor knowledge gleaned from pioneering days to the present time and all the experience acquired in producing motors for its own vast line of rugged power driven machinery is the inheritance of Allis-Chalmers Motors today. That knowledge, that experience and the guiding principle of quality as an ideal are built into every Allis-Chalmers Motor. They are the sturdiest motors on the market—bar none. • Allis-Chalmers district offices in all principal cities and many foreign countries are ready to assist you in all problems of motor application for standard or special drives.











Allis-Chalmers Motors will be on Exhibit at the National Machine Tool Show in Cleveland, Ohio

MOTORS

FOR EVERY PURPOSE

ALLIS-CHALMERS MFG. CO. MILWAUKEE WISCONSIN

jected to all ordinary mechanical operations such as drawing or spinning and sheets can be joined to each other by electrical welding. It is possible, therefore, to fabricate complete articles or build chemical equipment entirely of tantalum.

This metal is more resistant to chemical corrosion than gold or platinum and, although more scarce than gold, costs only a fraction of the cost of the latter. If tantalum is heated in the air to a high temperature, the metal burns to its oxide. For this reason all operations on this metal involving the application of heat must be carried out in vacuum furnaces, and this applies also to columbium. While tantalum metal which has been annealed in a vacuum furnace is very soft and ductile, a process has been developed by which the metal may be hardened to almost any degree of hardness, and this hardening can be done on finished parts.

Uses of Tantalum

Many applications for this hardened tantalum have been developed. Both tantalum and columbium are used in the manufacture of parts for high power vacuum tubes. Tantalum is used extensively for the manufacture of chemical equipment such as agitators, acid stills, heat exchangers, pipes and tubing for conveying hydrochloric acid, valves and nozzles used for water chlorination, parts for fountain pens, spinnerets for rayon spinning, thermometer wells, and other apparatus.

Tantalum combines with carbon to form a tantalum carbide of extreme hardness. Compositions in which finely divided tantalum carbide are held together with iron, cobalt, or nickel are used in the manufacture of cutting tools for machining metals and of dies for the drawing of wire.

One-Piece Cast Steel Decks on Air Compressors Withstand Severe Service

TO ELIMINATE all possible vibration and distortion of the decks or frames of its portable line of air compressors, the Chicago Pneumatic Tool Co. has found one-piece cast steel decks to be the most satisfactory. All portable units, therefore, are built with this type of deck.

For some years, fabricated structural steel decks were used, but misalignment often was encountered and the amount of vibration was a problem to consider. With the fabricated deck the joints would work loose, especially after a compressor had been towed over rough roads and fields such as are encountered in construction work. This would result in misalignment of the unit, hence, increased wear on the coupling or clutch plates and imposed excessive pressure on the bearings. Furthermore, the structural deck did not have sufficient rigidity to withstand the ever present inertia of the reciprocating forces.

The one-piece steel casting, unequaled for strength and rigidity has been used for the past 10 years to mount the compressor and engine. Correct alignment of the units always is maintained and vibration is reduced to the minimum.

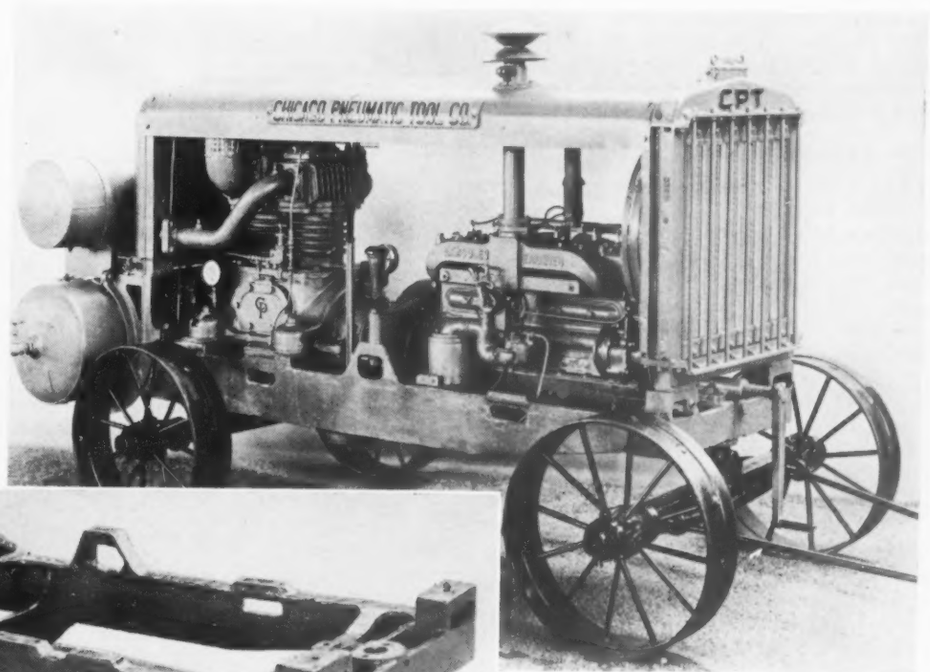
Service to which compressor decks are subjected is such that shock and vibration must be absorbed. Often this indispensable piece of contractors equipment is towed over rough fields, quarries and excavations, and this places severe shocks and strains on the deck. These twisting straining forces must be resisted by the deck if alignment of the units is to be maintained.

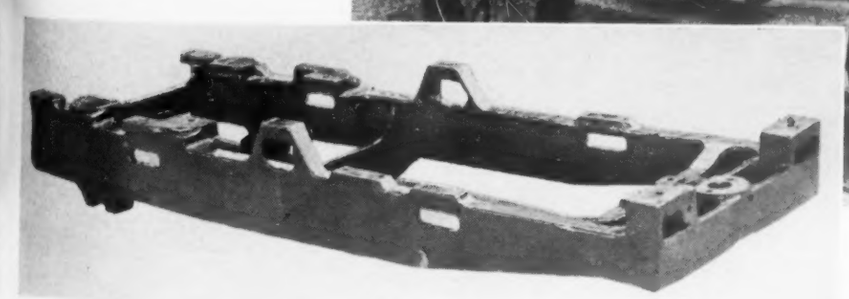
One-Piece Construction Advantageous

The deck as now produced is a one-piece steel casting made from a special grade of low-carbon, unannealed steel. The one-piece construction, as shown in the accompanying illustration, provides a substantial, rigid support for the compressor and engine and eliminates the maintenance expense which was present in the fabricated structure.

With one-piece construction, a unit of homogeneous metal formed in the mold in a molten state pro-

PORTABLE air compressors, such as the one shown at the right, frequently are towed for considerable distances over rough ground, consequently they must be constructed to withstand severe shock and vibration. Below is shown a one-piece cast steel frame or deck which meets these service conditions adequately





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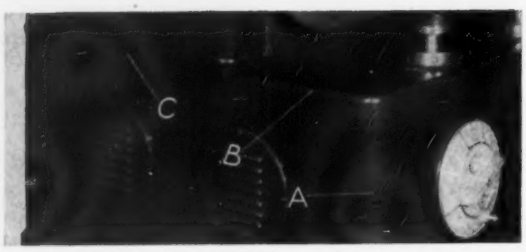


HALF-OVAL beading attached by small plug welds effectively covers breaks and joints C

vides continuous metal sections throughout. At the same time, this construction permits the designer to so distribute the metal that sections with uniform stresses are provided. This eliminates the possibility of a localization of stresses where the points are joined by welding which changes the molecular structure at the point of weld. With the engine and compressor both securely attached to the one-piece deck they assist in absorbing and resisting the vibration and shock associated with this type of equipment without deterioration to deck construction. There are no joints, connections or parts to work loose.

Automatic Multi-Operation Boring and Reaming Machine Has Many Features

A SPECIAL automatic multi-operation machine, built by the Hammond Mfg. Co., Cleveland, to perform four boring and reaming operations on the pump connections of the engine for a popular low-priced automobile, features the installation of an unusually large diameter ball thrust bearing, which, because of the high precision of the machine had to be held to extremely close limits.

The boring and reaming machine is shown in the accompanying illustration, and the bearing, made by the Bantam Ball Bearing Co., South Bend, Ind., is shown in the inset. The ball thrust bearing is 54 inches outside diameter, 48 inches inside diameter, and is 4½ inches thick.

Four Operations at a Time

The machine is designed and constructed so that each boring operation is held within limits of 0.001-inch, and is so timed that one finished engine block is delivered every 40 seconds, four operations being handled at one time. Gross production is 90 blocks per hour. All tools are driven by individual motors, while the feed and quick return are operated hydraulically. The heavy table is indexed hydraulically by a fluid motor. Pumps, controls and the fluid motor were built by Vickers Inc., Detroit.

The table which carries the jigs and engine blocks is 95 inches in diameter and is supported and indexed on the ball thrust bearing. Because of the close limits specified on production, this bearing must necessarily be of high precision The table is indexed for a 72-degree movement which takes care of one loading station and four machining stations. Three of the tool heads carry boring tools and the fourth a reaming tool. Because of its compactness, the machine requires a floor space of only 8 x 12 feet. Height to top of center column is 9 feet.

Improves Weld Appearance In Machine Construction

In designing for welding, it is important that more attention be given to the elimination of sharp corners than is given to this point in casting design. Castings, by the very nature of their production, have rounded corners and smooth lines, while a great many welded structures are made with two standard shapes, the corner of one overlapping the edge of the other so that a sharp corner is created.

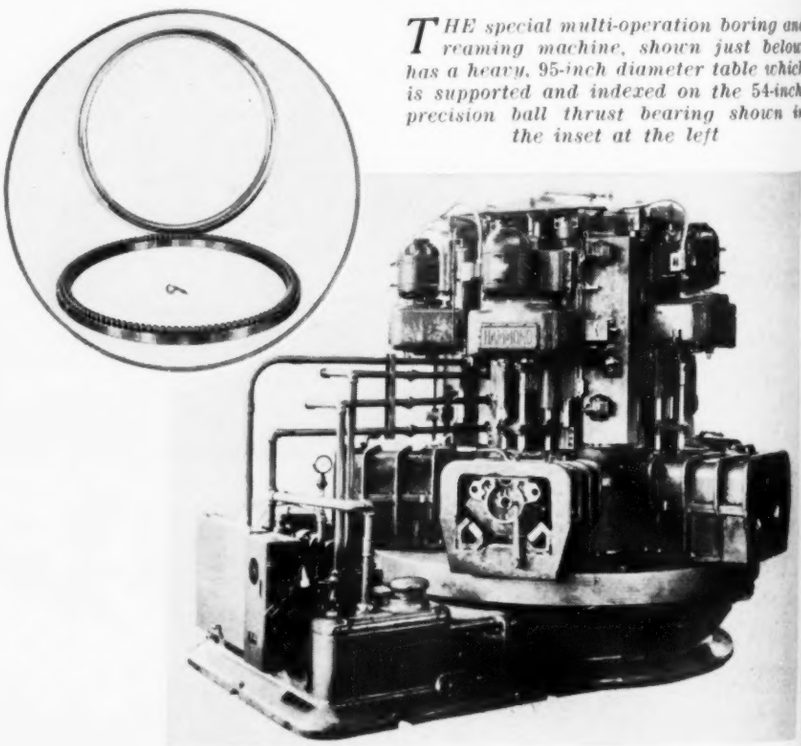
That such sharp corners are not necessary is demonstrated in the projection welding machine shown in the accompanying illustration. This unit is built by the American Electric Fusion Corp., Chicago. For the base, a formed plate is used with the front corners of the base, *A*, rounded to give a pleasing appearance. Further, at the junction of this base plate and table, and at other right-angle joints, *B*, the plates are offset and a large bead applied to fill up the 90-degree angle. This gives the impression of a fillet. At breaks and joints, *C*, the effect of the welding bead is softened by half oval beading that is attached by small plug welds placed alongside the welded joint. This small beading aids in improving the overall appearance of the machine in addition to eliminating the effect the weld might have on appearance.

Thus, with a little care in design, welded structures can be made to appear as clean as will be desired in any machine.

S S S

Composite Stainless Steel Bars Have Steel Inserts

Jessop Steel Co., Washington, Pa., has developed a new composite stainless steel bar stock known as Silver-



THE special multi-operation boring and reaming machine, shown just below, has a heavy, 95-inch diameter table which is supported and indexed on the 54-inch, precision ball thrust bearing shown in the inset at the left

The Perfect Alloy for Long-Lasting Pipe

The perfect alloy for pipe manufacture is like the fabled pot of gold at the end of the rainbow—something pleasant to dream about, but impossible to attain. Metallurgists strive to find it, but two barriers block their path—cost must be kept within the accepted competitive range—and conditions of service vary to an extent that makes any prophecy dangerous.

Years of research and thousands of tests in service confirm Republic's claim that Toncan Iron is today's low-cost ferrous alloy for long-lasting pipe. It is made by combining definite quantities of copper and molybdenum with highly-refined open hearth iron to form a chemically and structurally uniform alloy. This alloy is highly and uniformly resistant to rust throughout its entire section, nor is this resistance lessened by cutting, bending or threading the metal.

Considering the additional years of trouble-free service that Toncan Iron Pipe insures, its cost is really lower than that of less durable pipe. If you are interested in economy, use it. If you want additional information, write for a copy of "Pipe for Permanence."

REPUBLIC STEEL
TONCAN
COPPER MO-LYB-DEN-UM
IRON PIPE

Republic Steel CORPORATION

GENERAL OFFICES · · · YOUNGSTOWN, OHIO

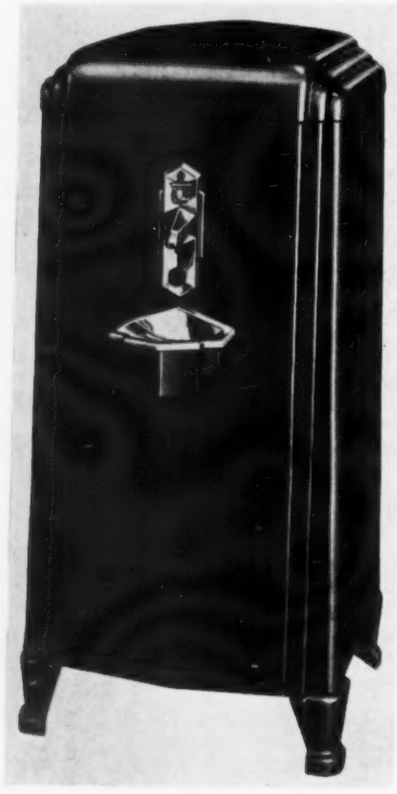
bond for which patents are pending. It is intended for use in any application where the surface of the bar must have corrosion and temperature resistant properties.

The product is described as a web-like structure in which inexpensive, low carbon steel inserts are mechanically held as well as welded by pressure applied at high temperatures, so as to obviate all chances of separation of the component parts. The cladding can be varied from 10 to 25 per cent depending upon the use.

Stock is made in rounds, flats, octagons, hexagons, sheets, strips and other shapes to meet special requirements. It now is being used in the manufacture of refrigerator trays and accessories. It also is being used for shafting in which machining is not required, also for architectural and general decorative trim.

The insert of the less costly metal reduces the cost of the bar and in some cases, because of added ductility, is an advantage in forming and fabricating.

Has Eye Appeal



NEW WATER COOLER FOR HIGH TEMPERATURE INDUSTRIAL LOCATIONS, produced by Kelvinator Corp., Detroit, combines attractive appearance with utility. The cabinet is of sheet steel finished with a coat of clear lacquer over two coats of golden bronze. Artistic, self-closing, chromium-plated, push-in type faucet is designed for one-hand operation. Water connections are accessible from rear of cabinet

WELDING, et cetera . . .

BY ROBERT E. KINKEAD

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

Penalty—Reward

FORMULA upon which the success of the welding industry has been built is easy to state, difficult to carry out. Find a better and less expensive method of doing a job. Sell the method and apparatus to an enterprise in a competitive field. Then go around and take the orders from the competitors of the enterprise which has been sold—they have to buy.

Every long-term profitable enterprise has operated on that formula; every failure has had its beginnings in the effort to make some other formula work. You have to do jobs better for less money if you want to stay in the welding industry. In terms of employment and profits, the welding industry is one of the most successful in the country.

But, this formula is directly opposite in effect to the social and political philosophy sponsored by many administration spokesmen. According to their philosophy, if you do a poor job farming or manufacturing or anything else, the government should supply you with funds to keep you going anyway. In such a world there would be no penalty for failure and no reward for success. That would lead, it seems to me, to about the same conditions as are found in a penitentary: The one ambition of every inmate is to get out.

Pressure in Welding

The beneficial effects of mechanical working of metal during a welding operation are apparent where the highest quality of weld in terms of physical properties are necessary.

A Cleveland manufacturer makes steel tubing which stands heavy forging operations without weld failure, using atomic hydrogen for heating the edges of the tube to be welded and then forcing the edges together by mechanical pressure. The net result is that the metal which was molten is squeezed out and the actual weld takes place at a temperature at which the metal is plastic.

Squeezing the molten metal out of the joint does two things—gets rid of included gas bubbles, and removes oxidized metal from the joint. This mechanical action in welding is always desirable but in many cases impossible to apply.

Sparks and Flashes

With the doors all closed and within the four walls of the room, it may be said that the welding situation in many steel foundries is deplorable. A good deal of the welding ought not to be done at all. But where welding is done, it should be a decent job. No small part of the difficulty comes from the foundry's customer. The customer should be educated to let small defects alone when they do not interfere with the usefulnesss of the casting. If responsible welding is to be done he should be convinced that responsible welding is done in that foundry. The few foundries which have carried out this policy have maintained the confidence of their customers and saved a good deal of money.

* * *

Men of welding experience who are interested in cost saving are usually shocked when they see what goes on in the maintenance department of a steel mill. The welding done in the maintenance department under the direction of the master mechanic saves so much money that it is almost an insult to suggest getting more productivity per man hour. In emergencies, the men will work long hours under almost impossible conditions. Difficult jobs are accomplished successfully by skill and resourcefulness. Yet, if the men are to earn more, their productivity must be increased. It can be done.

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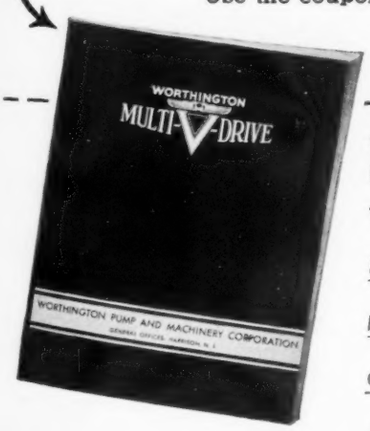

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—Photo courtesy Gerrard Co. Inc., Chicago

Wire tying machines find many diversified uses. The machine illustrated is used for reinforcing with 12 to 15-gage wire shipping containers weighing up to 600 pounds. The machine weighs 12½ pounds and consists of castings, forgings and rolled steel parts

LARGE USES OF STEEL IN SMALL WAYS

294th Article ◆ Wire Tying Machines

WIRE tying machines offer a simple means for quickly binding or reinforcing loose articles or packages. The equipment securely ties a loop of wire around the bundle with only moderate manual exertion by the operator, and not only accomplishes the work in a fraction of the time required of a man using only a pair of pliers, but also produces a more satisfactory tie.

The variety of users of wire binding machines is wide since the equipment is furnished in various sizes to accommodate products from a bundle of cancelled checks to a carload of steel pipe, steel sheets or other heavy articles. Where speed in packaging is an important factor, such as in newspaper mailing rooms, a mechanical binder is invaluable. For highest speed, a motor-driven bundler has been designed which ties a package more rapidly than is possible with the manually-operated types.

Bunching Loose Parts

Used extensively for tying or reinforcing cases or cartons, wire binding machines also have been adopted by many industries for bunching loose parts which are shipped without being boxed. Among various uses in the steel industry wire tying is employed to reinforce the hot top for ingot molds. It is also adapted to carload stowage of steel sheets, tin plate and pipe tying the material in place for shipment.

Machines Made in Various Sizes

Illustrated is a popular machine designed for moderately heavy duty. It is used for reinforcing shipping containers weighing up to 600 pounds with 12 to 15-gage wire. The operator obtains the necessary tension in the loop of wire with the lever in one hand and the other handle automatically seals the tie and cuts off the remaining wire. The machine itself weighs 12½ pounds and is fabricated from castings, forgings and rolled steel parts.

Machines of other sizes are available for tying packages of different weights. The most popular model is the smallest type, designed to tie bundles up to 60 pounds. This machine, weighing only 3 pounds, finds widest application because it can be used to tie a greater variety of products than the larger units. It ties with 18½ to 19½-gage coppered, steel wire by a backward and forward stroke of one lever. Parts of the machine are principally stampings. Two other models accommodate packages up to 90 and 100 pounds, respectively, while the largest is designed principally for extra heavy packaging and carload stowage use. The latter uses 8 to 10-gage steel wire. It weighs 25 pounds, largely castings and forgings.

A special high tensile steel wire, supplied by the machine manufacturer, is employed for the tying operation. Wire is furnished in coils and is fed to the tying machine from a container which prevents tangling. The container is a steel stamping. It is estimated that about 6000 tons of steel wire is consumed annually for tying and reinforcing various articles, bundles and cases.

Metal Treaters Defend Reputation for Competency

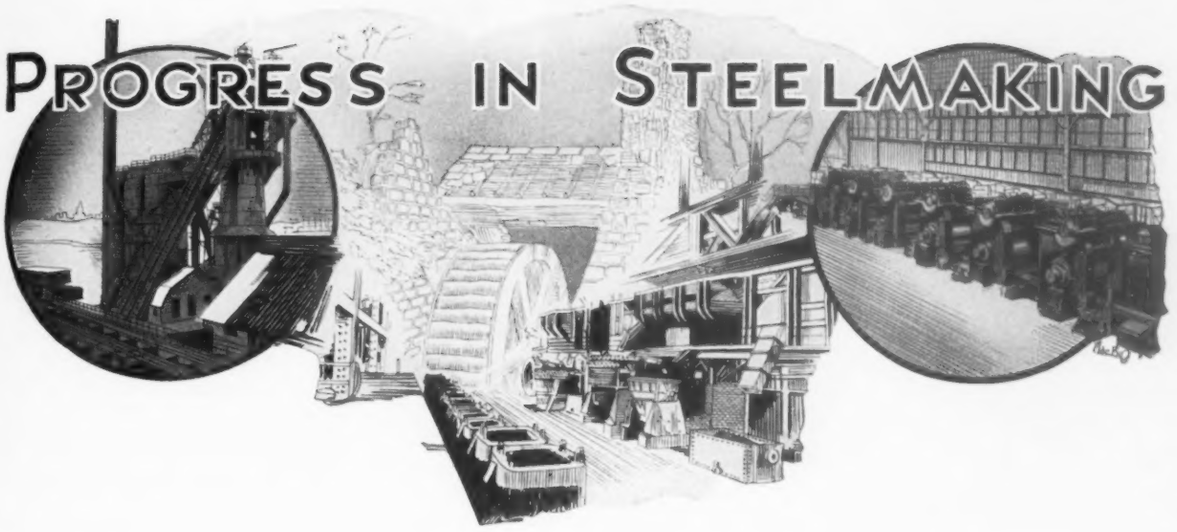
"Commercial steel treating companies seem to be the targets for lots of sniping recently", says the organ of the Metal Treating Institute Inc., of which Ralph J. Hoensheid, president Commercial Steel Treating Corp., Detroit, is president, and Arthur H. Nuesse, 1333 West Pierce street, Milwaukee, secretary.

"Speaking before an engineering group an engineer for one of the country's largest manufacturers of electrical equipment delivered himself of the following:

" 'Heat treatment is almost always done after machine work has been performed on the steel. Hence the logical place for heat treatment is in the shop of the machine manufacturer. The most expensive steel may be so improperly treated that results or properties obtained are far inferior to those of a cheaper steel which has been well treated.'

"We don't know just what grievance this particular individual was cherishing against the metal treating industry but if his words registered with his listeners the customer contacts of some steel treating companies probably became rather difficult, at least until the impression the speaker conveyed was dissipated."

Other officers of the Metal Treating Institute Inc. are: Vice president, A. N. Lindberg, president, Lindberg Steel Treating Co., Chicago; treasurer, W. S. Bidle, president, W. S. Bidle Co., Cleveland. Trustees, other than the officers, include A. D. Bach, president, New England Metallurgical Corp., South Boston, Mass.; A. M. Cox, president, Pittsburgh Commercial Heat Treating Co., Pittsburgh; C. G. Heilman, president, Commonwealth Industries Inc., Detroit; F. A. Snow, president, Fred A. Snow Co., Chicago, and Theodore Wiedemann, president, Wiedemann Machinery Co., Philadelphia.



Coating Protects Surface

High-finished metal surfaces and parts are protected from corrosion, dirt, water and moisture by a newly developed rubber coating which is applied either by brushing, spraying or dipping. The coating, which has non-inflammable and high-adhesive qualities, does not vulcanize to the surface but can be stripped readily from the work whenever desired. The product has numerous applications, such as the protection of surfaces of steel in transit to the consumer, protection of parts to be electroplated and masking portions of surface during pickling or painting operations.

• • •

Prevents Dross Formation

A mixture of asbestos fiber, sil-o-cel and salt is used at a Chicago wire mill to prevent the formation of dross on tin pots. At a Canadian mill a combination of sawdust and salt is employed for the same purpose. The material is scattered loosely over the tin bath to a depth of about ⅛-inch.

• • •

Disturbs Ingot Structure

Certain types of laminations and interior defects result from moving the ingot too quickly after pouring and charging into the soaking pit too rapidly, according to repeated experiments made at an Ohio open-hearth shop.

• • •

Alloy Addition Is Helpful

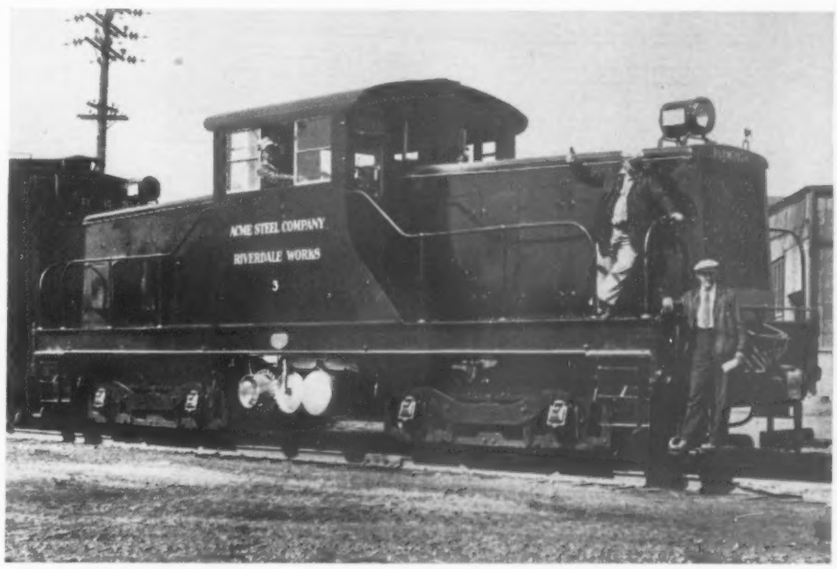
Free cutting properties of stainless steels are greatly enhanced by the addition of 0.25 per cent selenium. This element affords a tough steel and at the same time one that is cold worked easily. A ferroselenium has been developed for adding to the steel in the ladle.

• • •

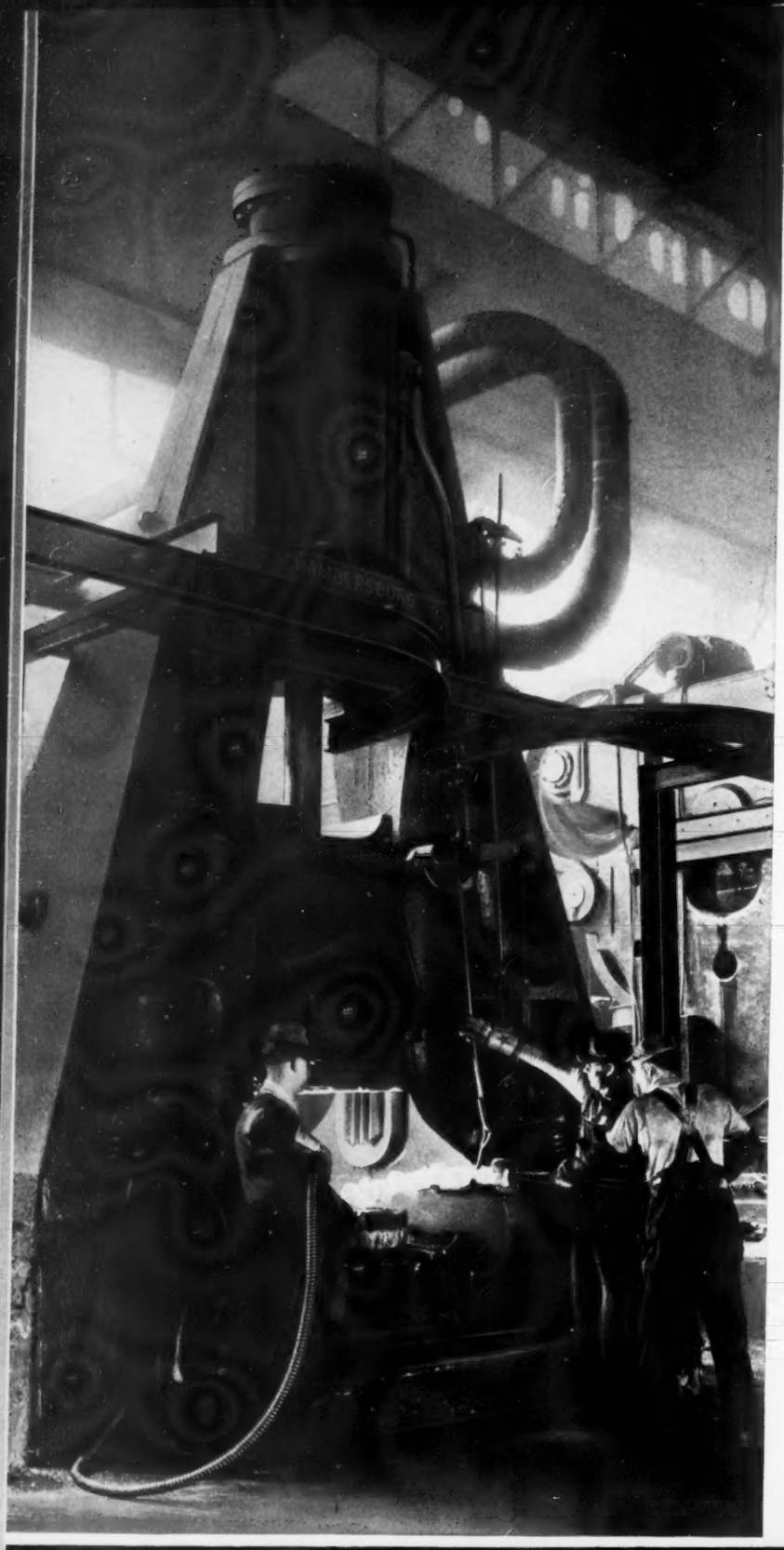
Nozzle Diameter Important

Ladle nozzles for pouring the majority of grades of bessemer steel give satisfactory service when their diameter ranges from 1¾ to 2⅛ inches, based on an investigation of about 200 blows. After pouring several heats, amounting to approximately 80 tons, the nozzle diameter through erosion increased from 50 to 60 per cent. Rejections at the chipping floor, however, were less on the first 40 tons poured than on the remaining portion of tonnage.

Locomotive Operates on Butane Gas



REPLACES TWO 50-TON STEAM LOCOMOTIVES—Butane gas not only is being used by the Acme Steel Co., Riverdale, Ill., for heating and cutting but for operating a new 65-ton locomotive. This type unit takes advantage of a low-cost butane fuel which leaves no carbon in the engine cylinders nor does it produce crankcase dilution. The locomotive performs in eight hours the work that formerly required 14 hours. The new unit is equipped with two 8-cylinder gasoline engines modified slightly to use butane gas. Each engine develops 250 horsepower at 1200 r.p.m. on this type gas and is directly connected to an electric generator which supplies current to four electric motors mounted one on each truck axle. Only one man is required in the cab. The Plymouth Locomotive Works, Plymouth, O., in collaboration with the Phillips Petroleum Co., Bartlesville, Okla., and the Climax Engineering Co., Chicago, announce this locomotive as the first installation of its kind



THE FORGE SH

Chambersburg Model J Board Drop Hammer

IN MODERNIZATIO

IN THE majority of metal wor industries, the drop forging is stock upon which many machi operations start. Therefore, the portance of the forging as it le the hammer cannot be over-estim in relation to the machining w follows.

Close-Limit Forgings Mean Less Finishing

The ideal of every manufacturer of metal parts is to l to remove as little excess stock in finishing as possible. modern lathe, milling machine, grinder, or other finis tool is a faster, more accurate piece of machinery t ever before, and to realize the most from these tru markable machines with which you will modernize plants, your drop forgings must have the fine, close li of accuracy made possible by the new Chambersburg hammers.

Forge shops equipped with these hammers are tur out, day after day, forgings to closer limits, working u smaller stock, and with a greater production than before.

SPEED

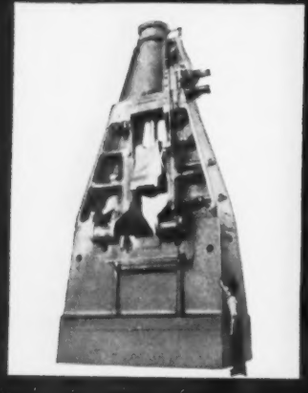
The reasons are exclusively Chambersburg reasons: Sp is one important one. The speed of the uptake of the r for example, permits the explosive action of the gase prisoned between the forgings and the die to "blow the forging; hence less draft is necessary. Controlled sp at impact also means fewer blows, and forgings finished higher temperatures; the saving in die life from this c alone is amazing.

Cylinder and Valve

In the steam hammer, the new Chambersburg pate valve and cylinder make possible tremendous power ings; one installation reflecting 40% saving. At another, w Chambersburg Model E cylin were installed on old hammers, cylinders and the cost of the cha

Chambersburg Model E Steam Drop Hammer forging automobile crankshafts

CHAMBERSBURG ENGINEER



CHAMBR

HAMMERS

...UST COME FIRST

...ver, were paid for in a few months *on the power saving alone.*

CECOLLOY

Both Board Hammer (Model J) and the Steam Hammer (Model E) have profited by Chambersburg metallurgical research which has evolved a series of synthetic nickel-molybdenum iron alloys, known as Cecolloy, of high tensile strength, but which absorb shock with the minimum of vibration. In the board hammer, this, together with perfect synchronization of the rolls, and heavier construction, has resulted in a hammer which, in actual practice has shown a 31% increase in production, has practically eliminated scrap, and has doubled die life.

Truly, the forge shop must come first, in any modernization program, when results like these can be attained on Chambersburg Hammers.

For information regarding Model E Steam Drop Hammer ask for Bulletin 255. For Model J Board Drop Hammer ask for Bulletin 252. A booklet is also available on Cecolloy, and specific questions will be answered cheerfully.

At right: Four 12,000 lb. Steam Drop Hammers (Chambersburg Model E's) in automobile forge shop.

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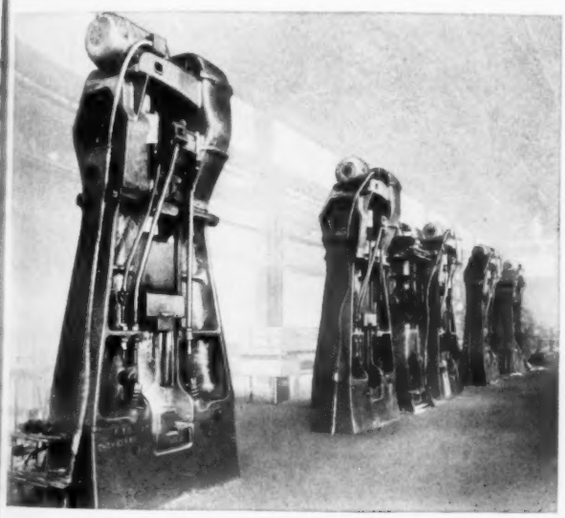
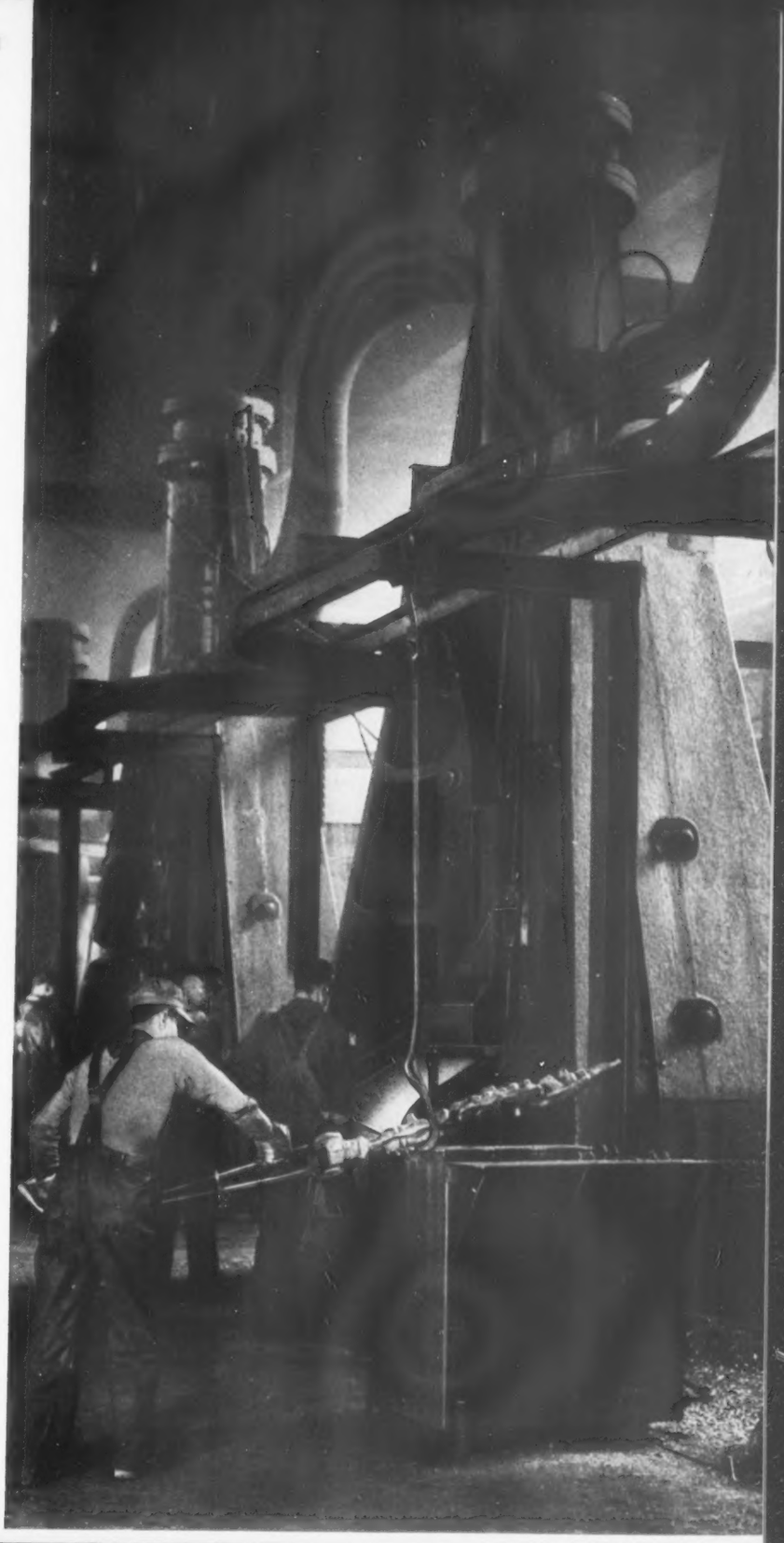
Below: Battery of Chambersburg Model J Board Drop Hammers in well-known industrial plant





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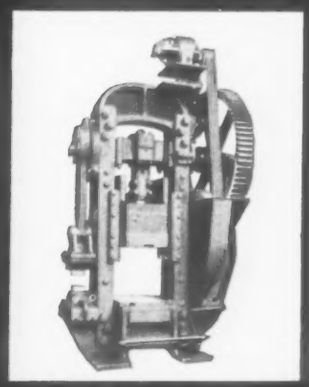

HEVI DUTY ELECTRIC COMPANY

Announce

They Have Acquired by Purchase From the

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All Rights and Patents Relating to

SMITH ALLOY No. 10

A NEW CHROMIUM IRON ALUMINUM ALLOY

Invented by MESSRS. S. L. HOYT and R. S. ARCHER

Smith Alloy No. 10 is the Alloy used in the new line of Hevi Duty Heat Treating Furnaces for Industrial and Laboratory use. It makes available to Industry Electric Heat with metallic resistors for operations to 2400° Fahrenheit. Arrangements are being completed for the commercial production of this Alloy as resistors of various sizes and for castings.

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

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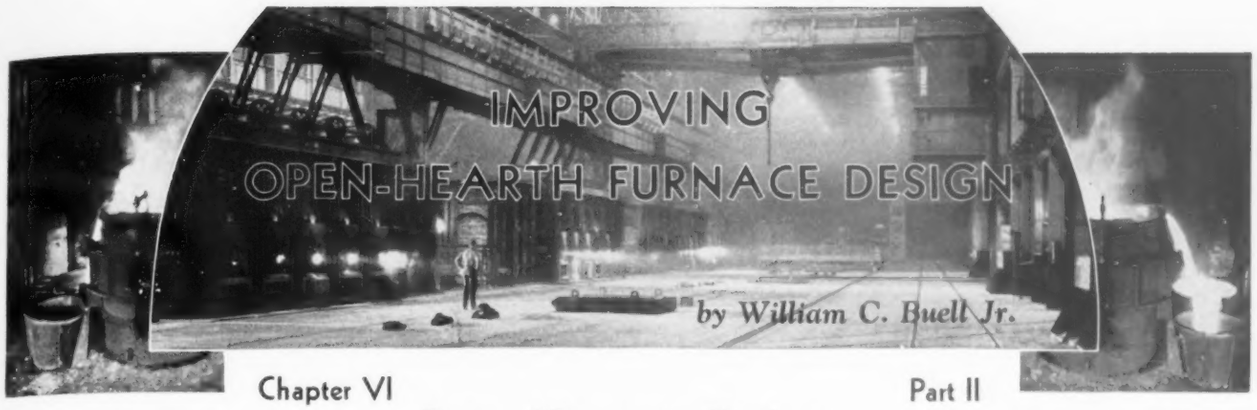


IMPROVING OPEN-HEARTH FURNACE DESIGN

by William C. Buell Jr.

Chapter VI — Part II

Design of Regenerator Chambers

ON THE grounds it is a fundamental tenet of correct design that any steel structure should be self-supporting and aligning and in no manner dependent on the brickwork it is presumed to bind, for assistance in performing either of these functions, the writer prefers and presents in Fig. 149 a steel binding design that is self-supporting, and self-aligning by virtue of its rigid construction.

The binding scheme consists of a tie ring, RT, which engirds a regenerator chamber just below grade. The ring is supported by the columns SC at the side, FC at the front, and BC at the back. The front columns also are required to support the fantail construction at the regenerator end. These columns, appropriately are framed into RT at the top, and excepting BCC, extend into pockets in the foundation into which they are grouted after having been properly registered in position. The buckstay, BCC, at the back is shortened and rests on the masonry between the connecting flues.

The buckstays, BS, at the sides are framed into RT as are those at the back, BSB.

The cross ties, CT, connecting complementary sets of side buckstays are strongly connected to the buckstays and the connection is made rigid through the inclusion of girts as indicated, or gussets.

The corner angles, CIA and COA, are framed into RT at their bottom, into the top tie channels, AT and TTS, and are strengthened longitudinally through their connection by the rods TL to buckstay BS1.

The skewback channel for the roof, USB, and that for the rider arches, LSB, are not fastened to the buckstays being merely supported by them in the horizontal plane.

Any longitudinal tension of the

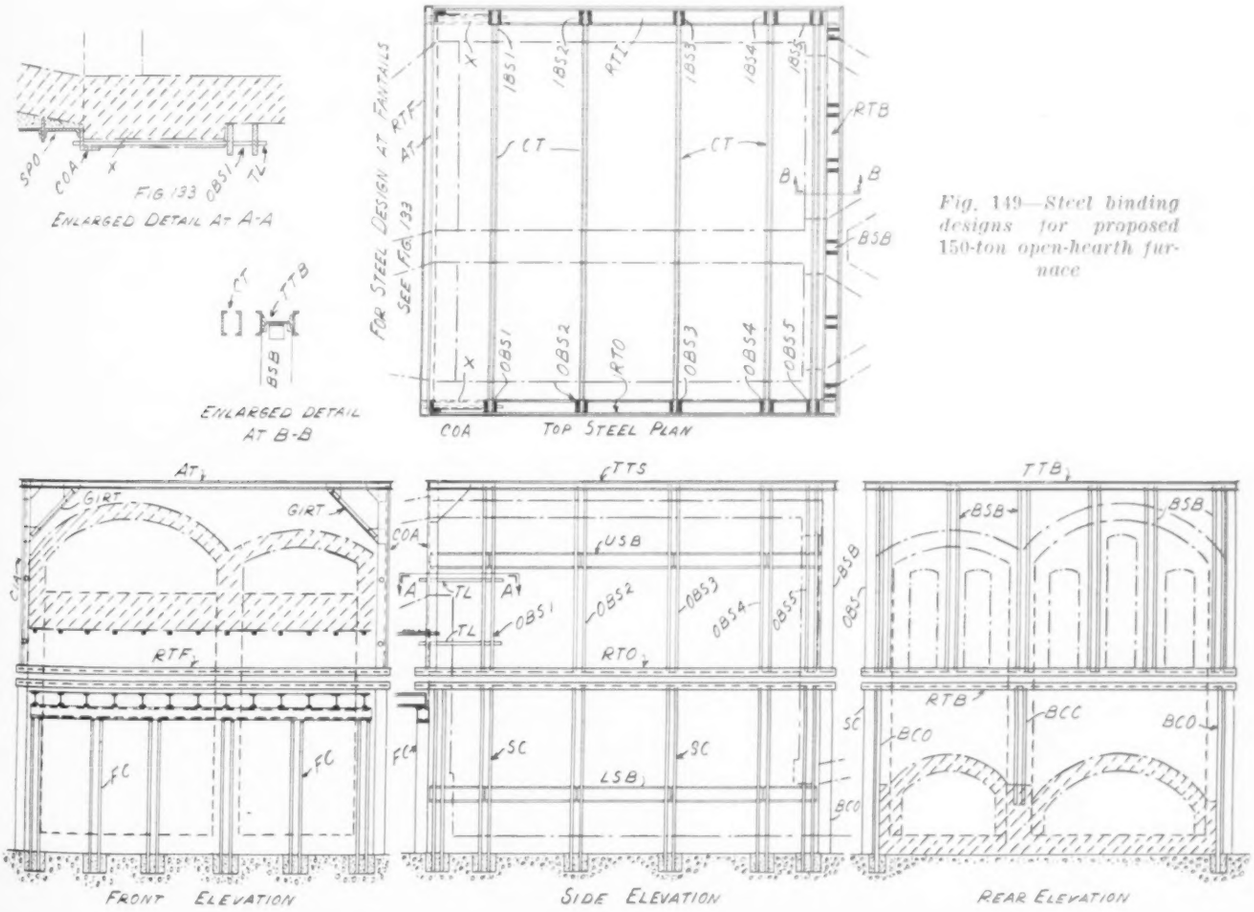


Fig. 149—Steel binding designs for proposed 150-ton open-hearth furnace

structure is restrained by the side tie channels, TTS. The front tie channel, AT, will carry a nominal tension loading in resisting the outward thrust at the tops of the corner angles.

The rear tie channel, TTB, will be required to restrain a slight but non-calculable horizontal leading from the top reactions of the end buckstays, BSB. Accordingly, this member should be strengthened and a simple method of accomplishing this is shown in the enlarged detail B-B, Fig. 149.

At equal temperature the thermal expansion of firebrick is but about one-third that of silica brick. In order to select steel sections a maximum outward pressure of 100 pounds per square foot has been assumed as the outward thrust of plane vertical walls of silica. In view of the difference in the expansion factors of fire clay and silica brick, the outward pressure is assumed as 50 pounds per square foot when fire clay refractories are used.

With this assumption and the maximum horizontal roof thrust as previously determined, the buckstays may be solved, the concentrated loadings as shown in the dimension and loading diagram, Fig. 150, being based on 8 feet of regenerator length, and a horizontal thrust of 1687 pounds per foot or 13,500 pounds total. The partially distributed load represents 76 square feet at 50 pounds per foot or 3800 pounds total.

These buckstays are solved in two steps, first for the concentrated loading by means of equation (38), next for the partially distributed loading by equation (45), and then combining the results, which are shown in the moment and reaction diagram, the top block, Fig. 150.

At 9000 pounds allowable fiber stress in rolled steel when used as primary members of an open-hearth furnace the section modulus of the combined buckstay members is about 81.

From Table L (originally appearing in STEEL, March 20, 1933 but since revised) the appropriate buckstay members are found as two 12 x 2-inch slabs. The combined modulus of the cross ties is about 5.2 on the long axes and any of the standard 8 or 9-inch channel sections will be satisfactory. However, on account of the excessive length of the span, such channels must be braced properly by the girts and reinforced towards their centers, or excessive deflection will result.

The corner angles, CIA and COA, will act as buckstays, supporting about one-half the loading of the slab buckstays, BS, or necessitating they be designed to develop a section modulus of 40.5 if rolled steel, or 40.5 x 9000/7000 or 52.0 if of cast steel as they probably will be. Cast-steel angles 10 x 10 x 2½ inches thick develop a section modulus of 56.8 which will meet the requirements, if cast according to ASTM specifications, "grade B hard". Such a section will weigh about 145 pounds per foot of length.

Solved by Equation

The columns, SC, are subjected to a distributed loading of sidewall thrust as well as the concentrated loading from the thrust of the rider arches and their superimposed load, if the height of SC is taken as 14 feet and the width of the supported wall as 8 feet and the unit loading as 50 pounds; the total weight acting will be 5600 pounds. This may be solved for bending moments and reactions by the application of equation (48).

The total thrust from the rider arches has been found previously as 14,880 pounds. The solution of the column for this loading is found through the use of equation (50).

Combining the diagram developed for the distributed and concentrated loadings shows the total stress values for the column. The data is delineated in Fig. 150 in the central blocks. It is likely that columns of the same sections as the upper buckstays will be used which is desirable and in this event the 12 x 2-inch double-slab design will be ample to restrain the horizontal loadings.

The loading of the tie ring, TR, is caused by the lower end reaction of the buckstays which is 11,580 pounds for the central members,

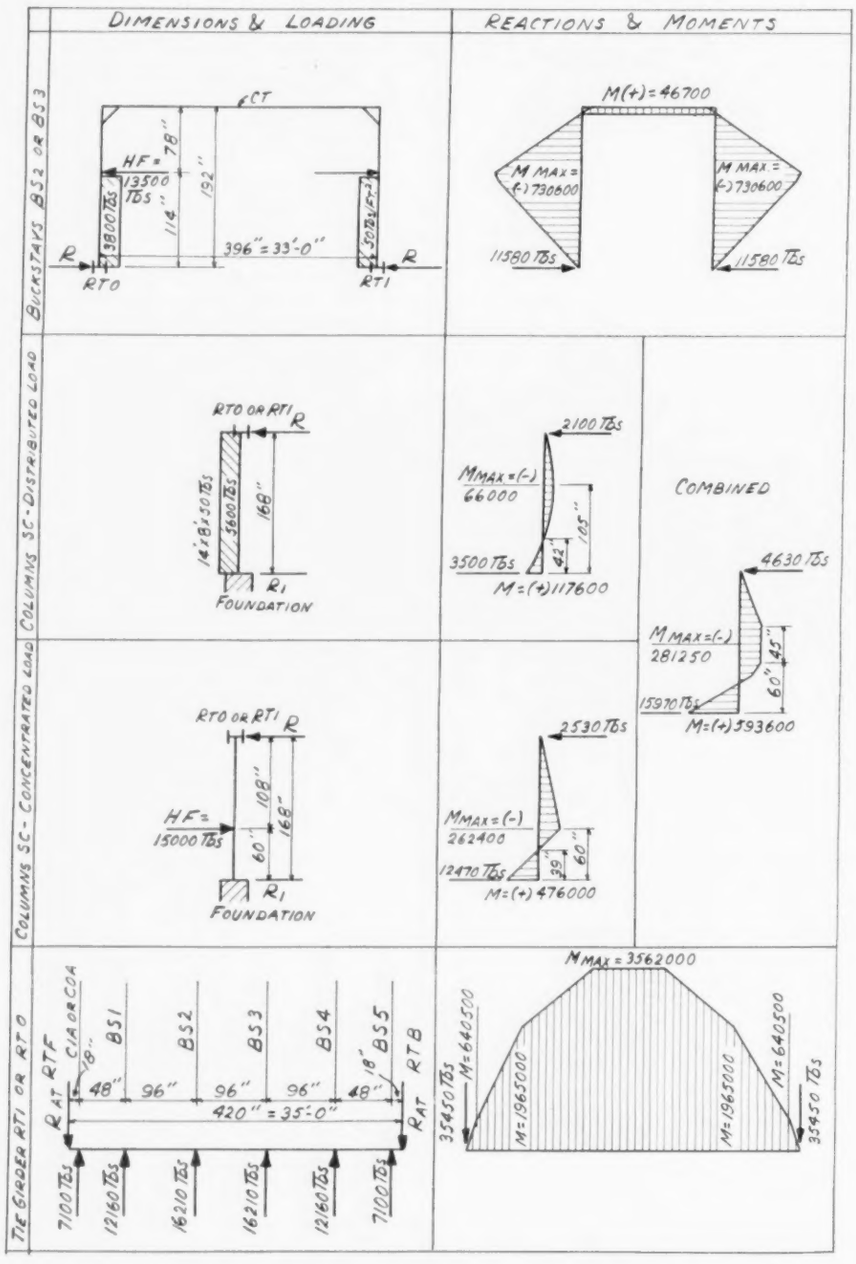
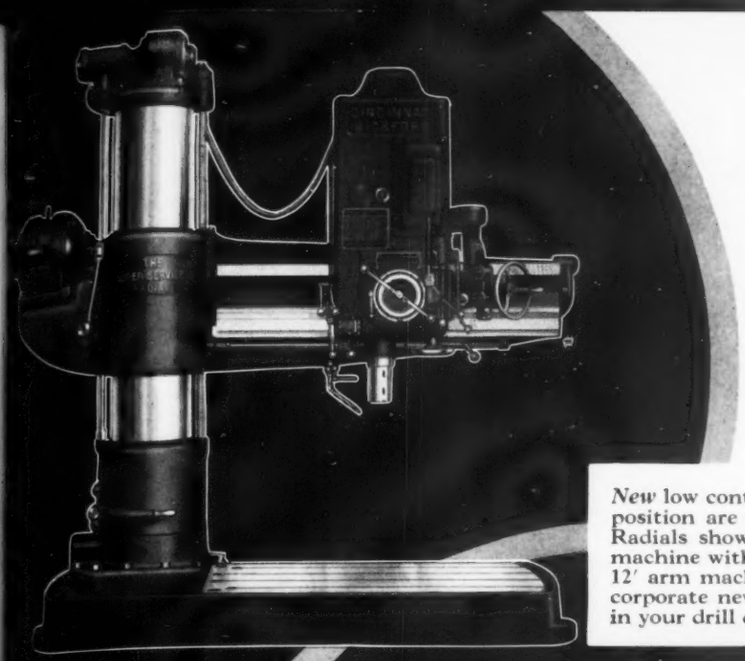


Fig. 150—Solution of principal members of regenator binding steel

Look at All Three



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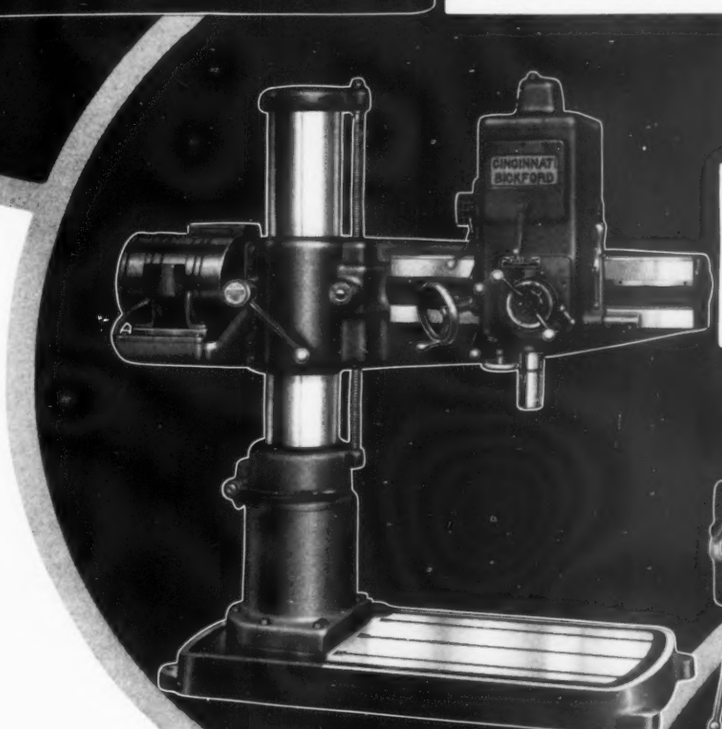

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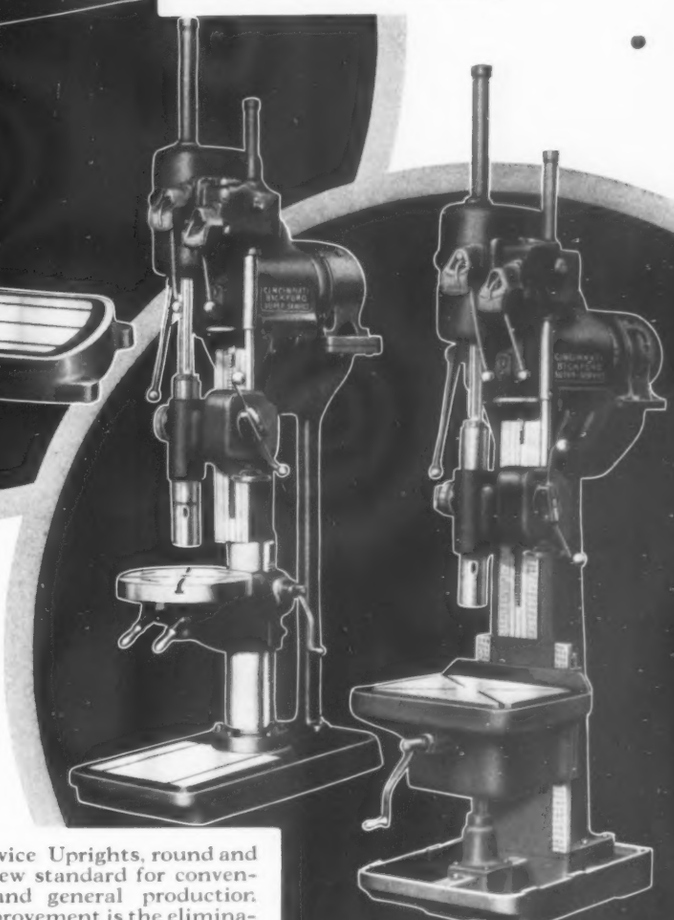

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BS2 or BS3, plus the combined reaction 4630 pounds at the top of the central columns, SC, or a total of 16,210 pounds. This maximum loading stresses only RTI and RTO materially in bending. While at the end RTF and RTB restrain reaction from the lower vertical members of the binding all reactions are nominal as all concentrated thrust reactions are absent.

Depicts Girder Loadings

The loading of the side members, RTI, or RTO, is given in the lower left-hand block, Fig. 150. Only at BS2 and BS3 is the maximum thrust from the support of 8 feet of wall length registered. At BS1 and BS4 the buckstays support but 6 feet of wall length and at CIA and BS5, but 3½ feet of wall length. The loadings noted are proportionate to the length of wall (and roof) supported.

The adjacent reaction and moment diagram discloses the resulting values which are found through the solution of equation (49). Working with 9000 pounds fiber stress the combined section modulus required is just under 200 if two like members are combined into a girder, and thus units similar to the CB No. 212, 21 x 9-inch, 96-pound beam will be required. This member has a 35-foot span and the item specified if used will not show excessive deflection with the loadings shown.

The end members of the tie ring should approach in size those selected for the sides, but may be varied somewhat to allow the most convenient method of framing the ends.

Questions often are asked regarding the value of the rigid type of buckstay binding as compared to usual tie rod type. If buckstays, BS2 or BS3, are solved only for the concentrated loading of 13,500 pounds as a simple beam supported at both ends, the maximum bending moment will be found as about 1,250,000 inch-pounds and the end reaction at the tie beam as 5500 pounds. When solved for the rigid design recommended the comparative figures are 590,000 and 9425, respectively. The modulus of the sections required will be about 140 and 66, respectively. Slabs 12 x 3 inches (in pairs) weighing 275 pounds per foot are necessary in the first instance and 12 x 2-inch, 183-pound slabs in the second. However, the end reactions in the second instance is greater than the first, requiring a heavier tie beam which, as before stated, will weigh about 96 pounds per foot.

If a tie beam of the tie rod type is used, however, a beam such as the CB 18 x 8¾-inch section weighing 64 pounds per foot would be suitable. Both of these beams must be used in pairs.

At the top the tie rod type would use a single 2-inch tie rod weighing 10.7 pounds per foot as against the two channels of the rigid type which would weigh perhaps 40 pounds per foot.

Carefully analyzed there is little difference in the overall steel weight of either design but the rigid features of the recommended type are so vastly superior to the tie rod type in supporting and maintaining the alignment of the masonry, and in so doing increasing its life and preventing cracks and distortions through which leakage can occur, that the older tie rod design of binding should be discarded.

As shown in Table CXVI, so far as refractory and radiation costs are concerned, the double-chamber regenerator design is much more economic than single-chamber design. Specifically, the life cost of the double-chamber arrangement with type B refractories is $33,250 and of the separate chamber design $44,300 showing a savings of $11,050 in favor of the double-chamber layout. In addition, further savings of $7400 in the cost of the steel (assumed as $80 per ton in place) will be found in the inclusion of the double-chamber arrangement as compared to the single-chamber design. A schedule of the steel binding in accordance with the arrangement of Fig. 149 but calculated for both types of design is given in Table CXX. A total of about 180 tons of steel is required for two double chambers and 275 tons for four separate chambers.

Regenerator Sidewall Plating

Many operators are prone to regard the plating of the regenerator sidewall as a guarantee against further leakage. This is not the case unless the plating is erected with much greater attention to method of installation than usually is observed.

If the sidewalls are unplated a crack developing in the masonry is observed quickly and resealed whereas if such develops under plate it may go unobserved for long time periods. Unless the edges of and holes through the plate have been welded completely to tightness and the upper and lower edges mortised into the masonry to an air-tight joint the plate instead of sealing may act to permit a leakage condition to continue unhindered.

The greatest leakage at the regenerator chambers likely is to occur in the vicinity of the roof skews or through the roofs themselves, neither of which areas are protected in anyway through the use of plate. Careful brick laying is the best insurance against leakage given a high order of masonry design and rigid steel binding.

Insulated vertical walls require support in order to hold the insulation material in its correct position. The covering may be plating or panels of expanded metal, see Fig. 67

Table CXX

Binding Steel Used in One Set of Regenerator Chambers

(Two Required)

Item	One Double Chamber		Two Single Chambers	
	Quantity	Weight, pounds	Quantity	Weight, pounds
	a	b	c	d
Slab buckstays,				
16 ft. @ 187 lbs. = 3000 lbs. ea.....	16 prs.	48,000	20 prs.	60,000
Corner angles,				
16 ft. @ 145 lbs. = 2320 lbs. ea.....	2 pcs.	4,640	4 pcs.	9,280
Cross ties,				
9″ channels @ 40 lbs./ft.....	374 ft.	14,960	396 ft.	15,840
Side ties,				
9″ channels @ 40 lbs./ft.....	70 ft.	2,800	140 ft.	5,600
Tie ring,				
21″ x 9″-96 lb. I-beams, pairs = 192 lbs.				
Sides	70 ft.	13,440	140 ft.	26,880
Front and back	68 ft.	13,050	72 ft.	13,820
Columns (slabs),				
14 ft. @ 187 lbs. = 2620 lbs. ea.....	21 prs.	55,000	35 prs.	91,800
Skewback channels,				
33 ft. @ 96 lbs. = 3170 lbs. ea.....	4 pcs.	12,680	8 pcs.	25,360
		164,570		248,580
Add 10 per cent for details.....		16,457		24,858
Total—one side		181,027		273,438
Total—one furnace, tons		181.0		273.5

(STEEL, Aug. 14, 1933). One of the finest of the later installations (plant K) uses the first mentioned method. Of the furnaces having plated regenerator walls, ¼-inch plate is found in furnaces J, I, G, H and M; ⅜-inch plate in furnaces L and F; and ½-inch plate in furnaces N, O and P.

The furnace binding system should be designed and constructed to such strength that it alone restrains the several loadings without any reference to plate which may be used. The only function of the plate should be to counteract the effect of wall leakage. If this is correct in principle then there is no reason or excuse for the ⅜-inch and ½-inch thicknesses of plate used in several of the typical furnaces. As a matter of fact, and for the purpose of sealing only, it is probable that a plate or sheet, lighter than even the ¼-inch thickness, say 10 gage, could be installed more effectively.

Recommends Expanded Metal

On account of the property of easy inspection, which will allow prompt resealing if leakage becomes evident, the expanded metal design is preferred, but if plate is to be used as a sealing medium, then the lighter plate to cover all vertical plane surfaces of the furnace, except the bulkheads, should be installed to obtain efficient operating results.

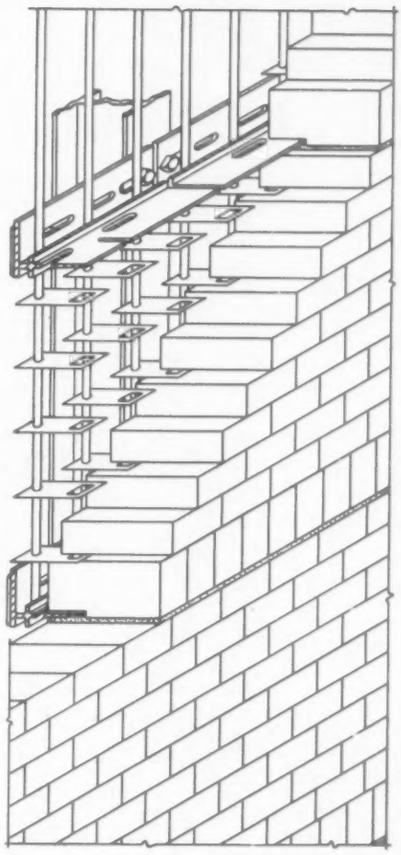
When plate is used as a sealing medium it will be much more effective if a space of ½ to ¾-inch is left between it and the brickwork. As the wall is constructed this space is filled with a liquid slurry of calcium sulphate (plaster of paris) which will form a monolithic inner surface sealing all the interstices in the brickwork.

(To be continued)

Designs Suspended Wall For Boiler Furnaces

A new type of suspended wall construction for both large and small industrial and boiler furnaces has been introduced. The design permits the use of either insulating or standard refractories, or both, and the wall may be constructed either as an air-cooled wall or as an insulated wall. In the high temperature zone provision is made for the circulation of cooling air in order to prolong the life of the refractory lining, while in the low temperature zone insulation is provided in order to maintain low radiation losses.

Only standard size refractories are used throughout the wall. The base brick merely are turned on edge and notched so as to protect the horizontal base castings from the radiant heat of the furnace. The balance of the refractories are carried in sections by the series of base castings and complementary units which provide the necessary horizontal support, as shown in the accompanying illustration. The new construction was designed by the Chicago Fire Brick Co., 1467 Elston avenue, Chicago.



Perspective of new type suspended wall construction

Annealing Equipment Is Fired with Mixed Fuel

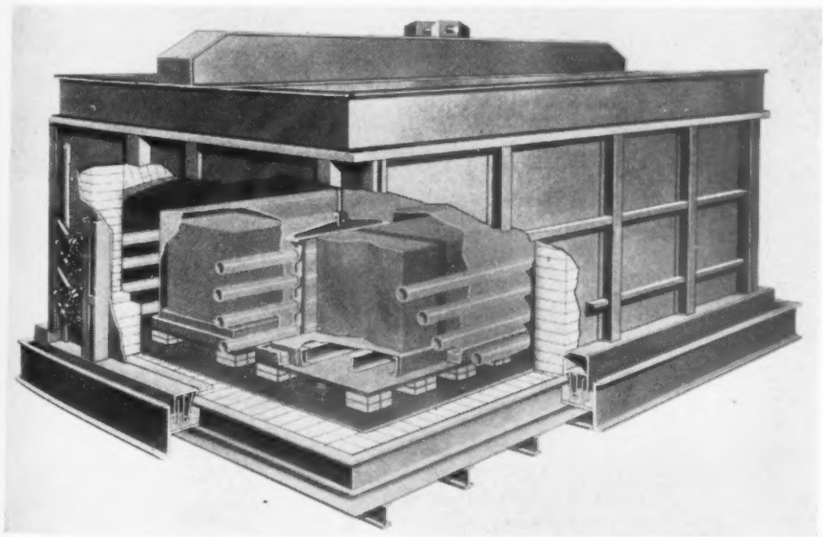
Complete radiant tube annealing equipment including covers, bases and auxiliary units for the new broad strip mill of the Bethlehem Steel Co., Lackawanna, N. Y., will be furnished by the Surface Combustion Corp., Toledo, O.

The installation will be the largest of its kind and is unique in that it will be fired with a 300 B.t.u. mixture of blast furnace and coke oven gas. The installation represents another milestone in annealing methods in steel production, inasmuch as all annealing equipment in this modern mill operates under controlled atmospheres.

The atmosphere is supplied by three 15,000 cubic feet per hour Surface Combustion DX gas producing machines. The same kind of gas used for heating the radiant tubes is deoxidized in these units. This again is a new application of this mixture of gases, an advancement that means interesting economies.

Bethlehem Steel Co. also has purchased from Surface Combustion Corp. complete radiant tube annealing equipment for the new tin plate mill at Sparrows Point, Md. These furnaces are of the double-row type having radiant tubes on both sides and center. Each cover will accommodate eight piles of coils arranged four on each side of the center row of radiant tubes.

These mills will be the first to be equipped throughout with radiant tube annealing covers.



Cut away section of radiant tube type annealing furnaces showing location of tubes and product being annealed

American Standards association, 29 West Thirty-ninth street, New York, has compiled a list of all published American standards and safety codes which it has on sale. The list sets forth the price of each standard.

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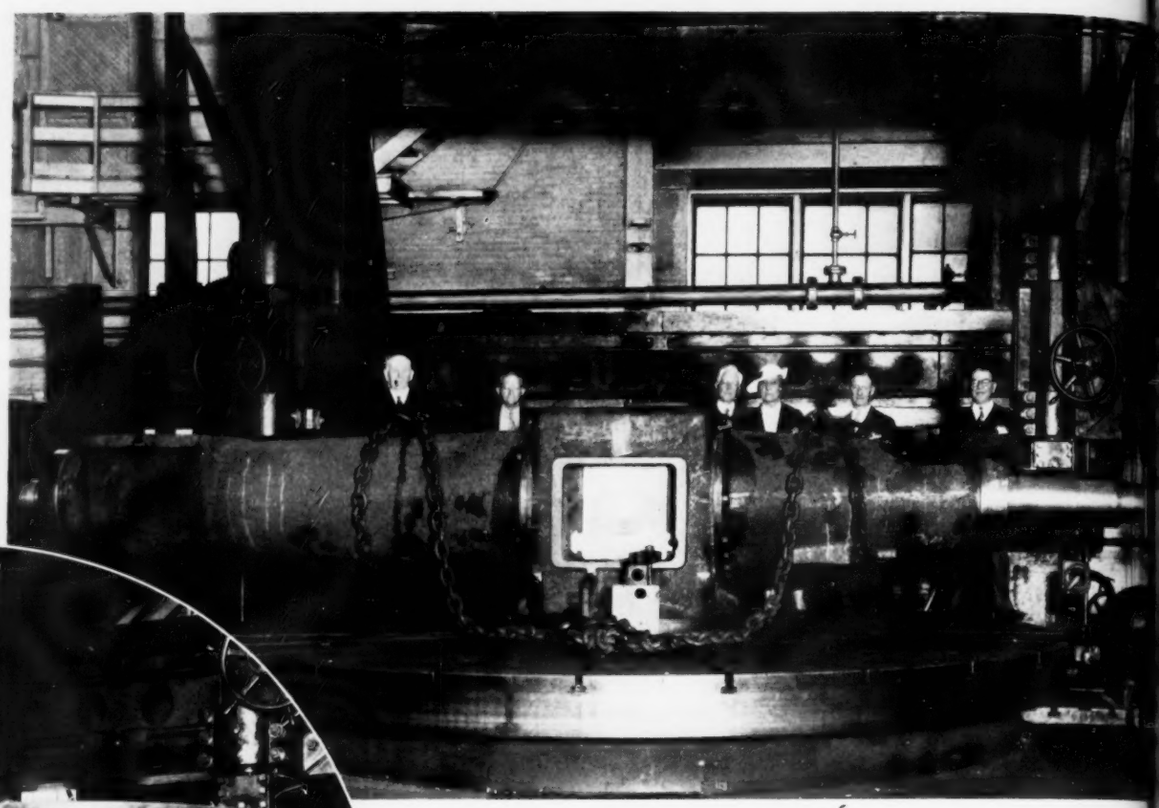

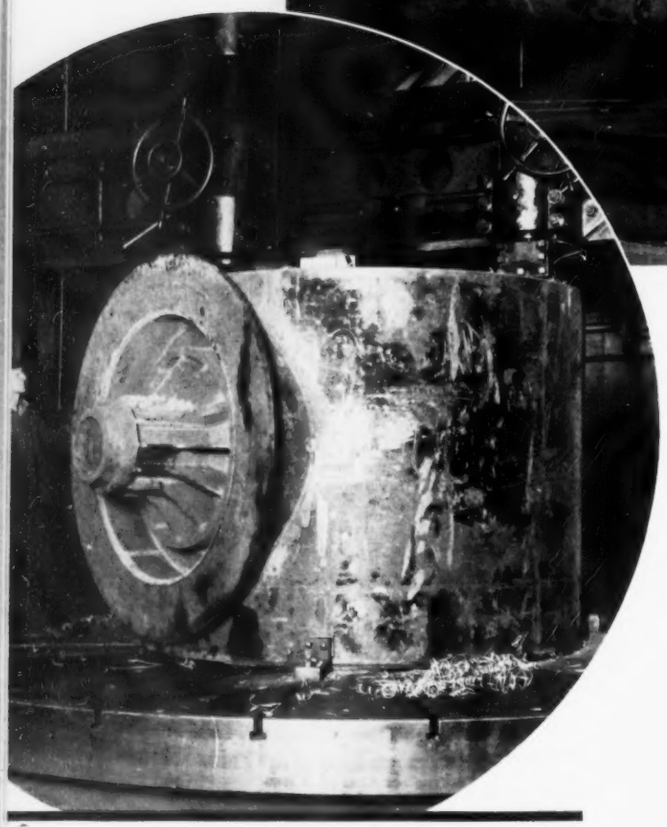

Welded steel centerpiece (welded construction and machine work by Wellman) for 82-inch telescope—104-inch diameter, 82-inch high. A structure designed for welding to obtain maximum rigidity with minimum weight. Circumferential and vertical ribs are 10-inch I-beams. Hub is a .38% carbon forging. Main welds are 100% penetration. Entire unit was thermal stress relieved before machining.

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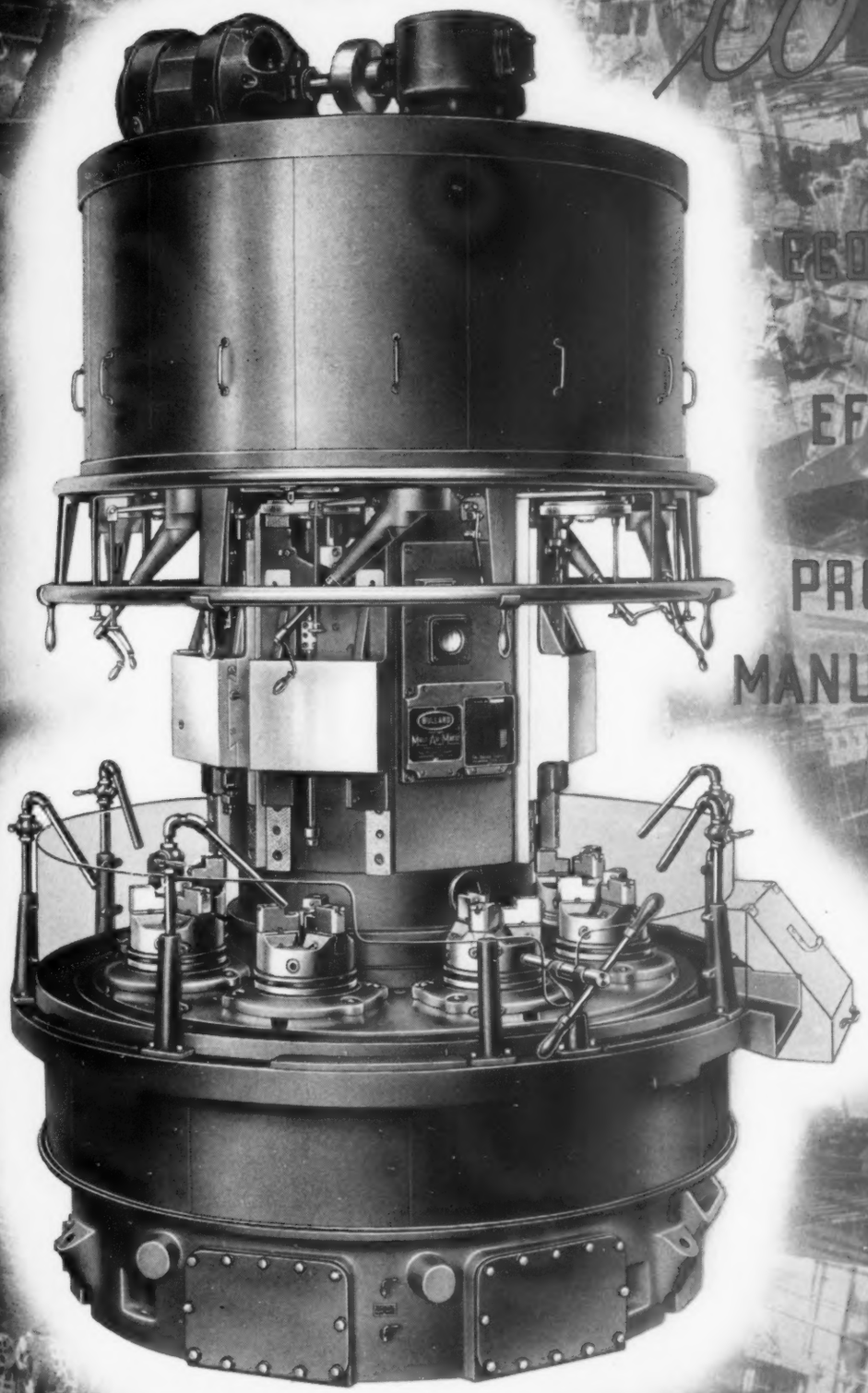

VERTICAL *Turret* LATHES

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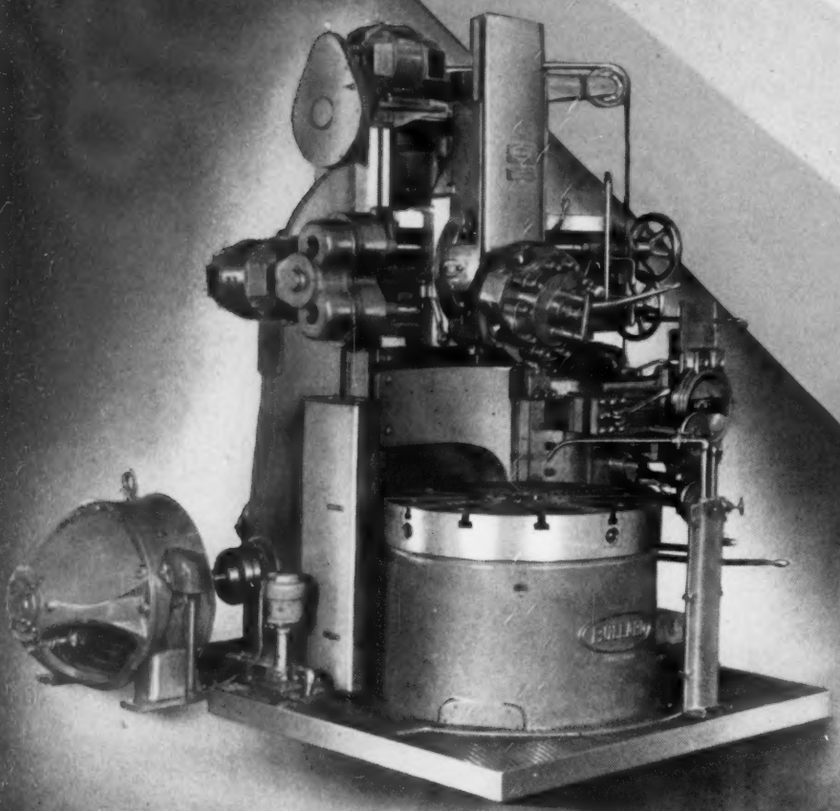
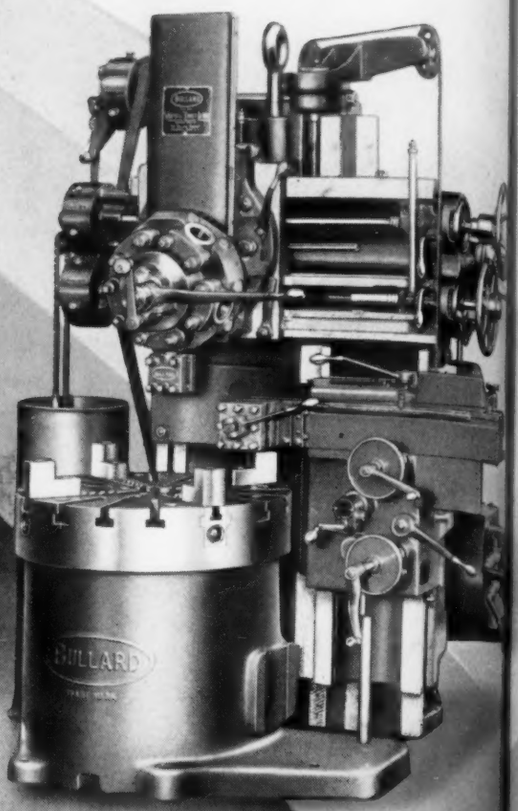


HIGH SPEED TYPE



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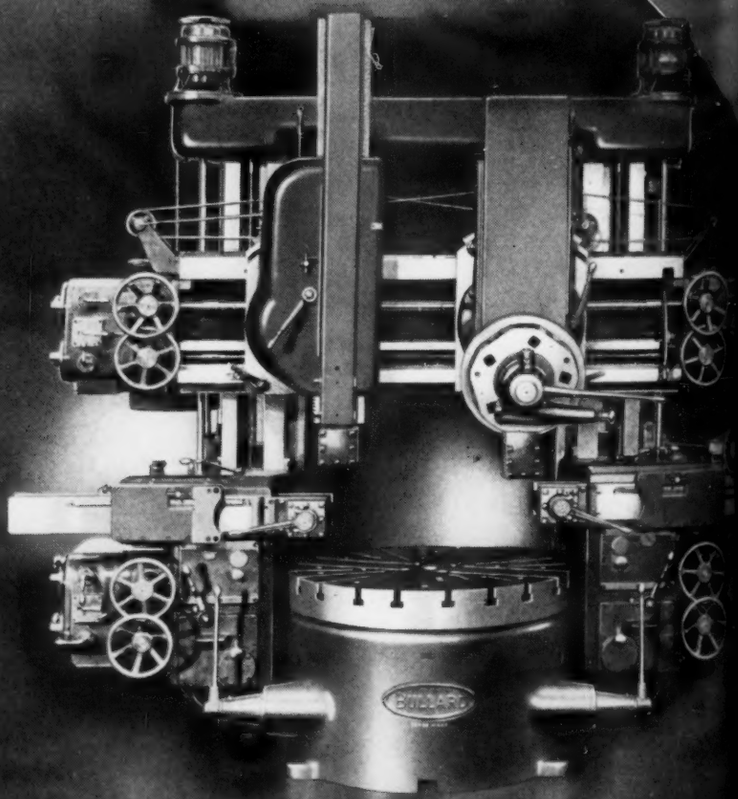
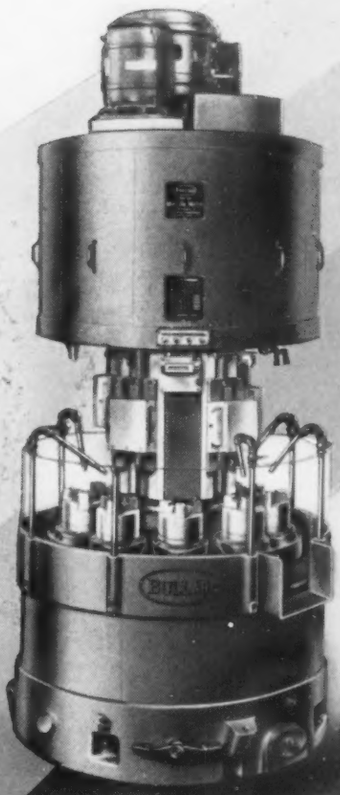
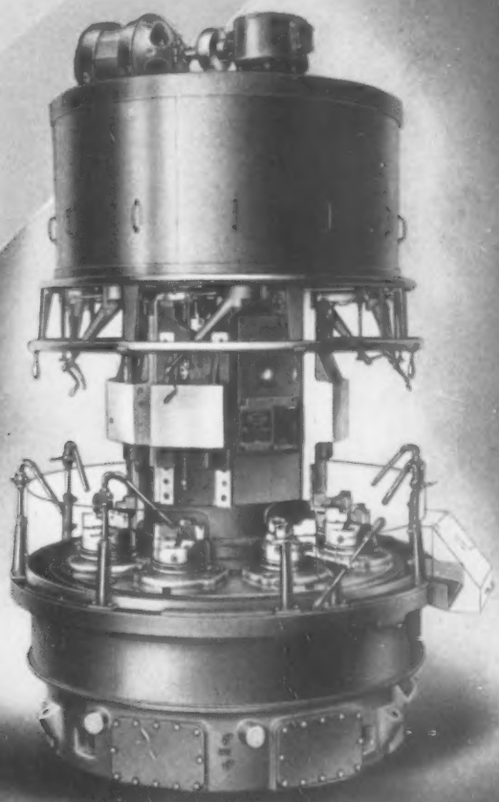


HYDRO-SHIFT

MULTIPLE *and* SINGLE SPINDLE AUTOMATICS



TYPE "J"
MULT-AU-MATIC



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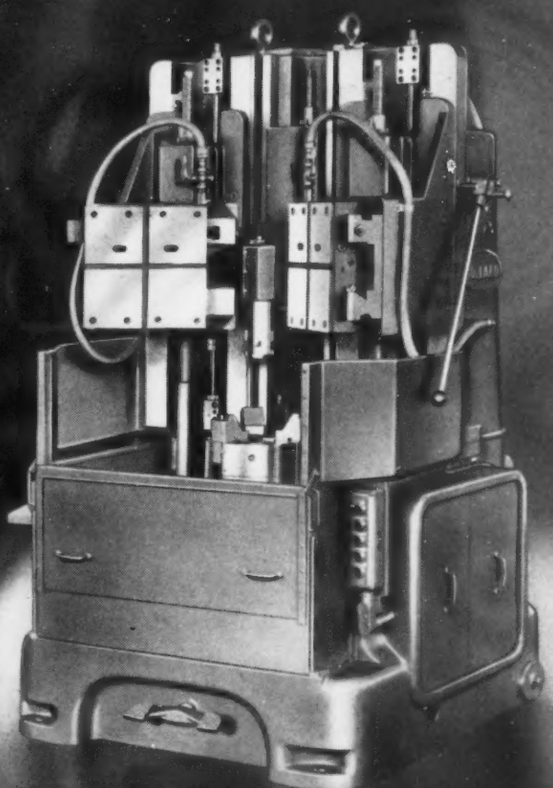


SINGLE SPINDLE
AUTOMATIC

Requirements for Modern Automatics call for Low Cost reproduction of quantity lots in less time and to even closer limits than heretofore.

Ruggedness to withstand the higher speeds and heavier feeds as applied to the tougher materials of today's products is only one of many important features of Bullard Machine Design. See these manufacturing units at The Show.

BOOTH 27

B·S

ON EXHIBIT— A representative line of modern, efficient, cost-cutting machine and tool equipment of vital interest to the manufacturer who requires accuracy of product at low unit cost. May we show you this equipment at Booth 27? Brown & Sharpe Mfg. Co., Providence, R.I., U.S.A.

BROWN & SHARPE

BOOTH 27

....*opening a* NEW ERA *in* PRODUCTION MILLING

---*the New* No. 12 *Electrically Controlled* PLAIN MILLING MACHINE

See it in operation at the Machine Tool Show to help you visualize its production possibilities.

BROWN & SHARPE

THE MACHINE TOOL INDUSTRY SPEAKS FOR ITSELF

An Analysis of Opinion of Representative Machine Tool Builders as Expressed in STEEL'S Symposium on "To Buy or Not To Buy"—Reasons Why You Can't Afford Not To Use Modern Machine Shop Equipment

BY GUY HUBBARD

IN MANY cases the opinion of a seller as to the merit of his products must be taken with a grain of salt by the prospective purchaser. However, there are important exceptions to this — especially in the engineering trades. One of these is represented by the machine tool industry, which today is offering to the metalworking industries plant equipment and engineering and production service, the economic importance of which never has been equalled in the history of mechanized industry.

Fortunately for machinery-using interests, the machine tool industry knocks at the door not once, but many times, and gradually and in rapidly increasing numbers the doors of manufacturing plants are being opened to the high type of sales engineers who represent the machine tool builders. There could be no surer sign of industrial reawakening in America than the present upswing in machine tool buying, but it should be remembered that the machine tool industry was up and around even before the crack of the dawn of the industrial revival, striving sincerely and manfully to arouse other industries to the coming of a new — and we hope brighter — day.

An Eleventh-Hour Rush!

The writer makes this statement with considerable feeling, having just spent several weeks at the plant of one of the large builders of production machine tools, which after several years of relative inactivity, suddenly has to work night and day to take care of customers who, like the multitude in a Pullman washroom, have awakened at the last minute and are all demanding attention at once.

As a participant in and as an observer of the machine tool building and using industries for a number of years, the author has been asked by the editors of STEEL to sum up for its readers the highlights of those statements by leaders in the machine tool industry which have appeared weekly in this publication since June 3, 1935. These statements on the subject "To Buy or Not to Buy" have, of course, presaged the coming of the machine tool show of Sept. 11-21, 1935, but they are far from being propaganda as that term generally is understood. They are moderate statements of facts by high-minded gentlemen who see both sides of the case, but who know that they have a vital message, the truth of which the show finally will drive home.

GUY HUBBARD

BEGINNING in the June 3 issue and continuing to date STEEL *has presented in each issue one or more articles by representative manufacturers on the advantages of using modern equipment to meet today's competition. In the accompanying article, Guy Hubbard, who through many years of experience in the machine tool industry is well qualified to discuss its problems, summarizes and analyzes the salient arguments presented by 14 leading machine tool builders who have contributed to* STEEL's *symposium. The article presents unanswerable reasons why manufacturers should modernize in plant and equipment.*

—THE EDITORS

Typical of these is the statement by Charles J. Stilwell, vice president, the Warner & Swasey Co., Cleveland. As president of the National Machine Tool Builders' association, Mr. Stilwell was chosen to initiate the series of articles. At the beginning of his discussion, Mr. Stilwell says, "The subject (obsolescence) must be treated fairly of course, and a machine tool cannot always be regarded as obsolete simply because it is old in the number of years it has been in operation, and particularly so if it is still performing its function efficiently and satisfactorily. . . . So long as the machine provides sufficient and efficient power, and so long as it is in good operating condition, it may well continue to be a useful manufacturing unit and may not necessarily fall in the category of obsolete tools."

Age Is Not a Criterion

Mr. Stilwell actually illustrates this statement with examples of lathes more than 25 years old which —for the limited purposes for which they are used — are entirely satisfactory. Furthermore, he cites the case of a company which sawed an old engine lathe in half and by moving the ends apart created a satisfactory machine for machining Kelly bars up to 30 feet long — this at a cost of $1800, against $15,000 for a new machine especially designed for this operation.

Statements such as these may not be high pressure salesmanship, but they certainly will lend weight to later statements by Mr. Stilwell as to the economy and added efficiency of new machinery in cases where it is

justified. For instance, the machining of a clutch housing and gear on which a new type turret lathe has cut the time from 124 to 38 minutes, and the machining cost per piece from $3.10 to $0.95. This represents a net profit of 122 per cent annually on the investment of $4475 in the new and fully equipped turret lathe, figuring conservatively.

Here is Mr. Stilwell's "yardstick" for measuring up the economic stature of production machine tools: "Obsolescence does not depend entirely on age as measured by just so many years; in numerous cases machines built as recently as five years ago have outlived their economic usefulness. As we see it, the only correct approach to the problem of buying new equipment is from the standpoint of cost of production. Because new tools of today's design are capable of much higher speeds and are built with much greater rigidity, they justify themselves economically by getting out much greater production, with improved finish of the machined parts. It is for this reason that they quickly pay for themselves in volume production lines."

16 Machines for 39!

Tell Berna, general sales manager, the National Acme Co., Cleveland, echoes Mr. Stilwell's honest conservatism when he says: "While it may not be economically justifiable in all cases to make replacements, the possibilities are such that no metalworking company can afford to ignore them. At the least, cost studies which will indicate clearly what can be accomplished with new as against old machines, are warranted at all plants where operations are on a volume production basis and where costs per piece are of vital importance."

Mr. Berna, as a spokesman for that group manufacturing automatic screw machines and automatic chucking machines, cites cases where as few as 16 machines of the latest model are doing the work of as many as 39 machines of the models of about 1925, at the same time doing smoother and more accurate work. At this point the writer—an automatic machinery man himself—can hear in imagination shouts of "Technological unemployment!" My answer is: "Nothing of the kind!" The parts produced by these machines are automobile details, the reduction in the cost of which was a vital element in the lowering of the cost of the car as a whole to meet the restricted buying power of the public. High cost parts mean high priced cars which the public will not and cannot buy and that means unemployment throughout the entire automobile industry and in its manifold related industries. Low cost parts, at the expense of some technological changes wholly within the industry, have made possible today's volume sales of cars and have put untold thousands of people back to work throughout the country.

Mr. Berna mentions as key improvements antifriction bearings, which increase versatility by allowing wide ranges of speed needed for efficiency on parts from the smallest to those of maximum machine capacity; adaptation of the latest materials in construction giving lightness with rigidity; standards of ac-

James Nasmyth and His Steam Hammer

(Above)—Henry Maudsley and His Engine Lathe

(Left)—Eli Whitney and His Milling Machine

The torch of genius, which in the pioneering days burned brightly for Maudsley, Whitney, Nasmyth and others; today casts its brilliant radiance upon the creations of the machine designers of 1935. The potential economic importance of their handiwork never has been equalled in the history of mechanized in-industry.

Illustrations by Schroeder, by courtesy of MACHINE DESIGN

curacy unheard of in older machines; elimination of idle time; accessibility; machine tool cost reduction through unit standardization; elimination of the need for secondary operations; and last but not least, the banishment from the latest models of the physical and mental hazards which are all too common in older machines.

Henry Buker, vice president, Brown & Sharpe Mfg. Co., Providence, R. I., likewise seconds the opinions of Mr. Stilwell, when he says: "New machine tools usually are purchased because of one of four compelling reasons: A company buys because it is starting a new business, it wants to expand production, it seeks to reduce unit costs, or it desires more accurate work.

"While the obsolescence factor must be considered, age does not necessarily mean a machine should be replaced unless the new machine can produce more work or with greater accuracy. Where average limits are required, and the demands for quantity are not emphasized, old machines may answer the purpose, judged from the financial standpoint. It is undesirable, therefore, to urge a customer to replace an old machine unless increased production, reduced costs or greater accuracy are required."

Mr. Buker stresses the need for new tools in cases where limits of accuracy have tightened and production demands increased. While he commends heavier construction as making for accuracy, he draws a sharp line between properly distributed weight and mere bulk, the latter often being a hindrance rather than a help, particularly in small, high-speed machines.

Buyer Should Make Analysis

In analytical study of production costs, Mr. Buker recommends an initial self-analysis by the user company rather than by sales engineers of competing machine tool builders. As he sees it, the latter method automatically invites the participating machine tool builders to bring excessive sales pressure to bear on the prospect, in the heat of which the sales talk is liable to get ahead of the merits of the equipment involved.

Howard W. Dunbar, general manager, grinding machine division, Norton Co., Worcester, Mass., is convinced that improved equipment is a good investment regardless of whether business continues to improve or whether it again drops off. This is true particularly if the future continues to hold tendencies toward inflation, in which case the equipment will prove infinitely more valuable than the money required to buy it.

He mentions the changed thinking in industry from terms of 0.001-inch limits to those of 0.0001-inch as of particular significance in the case of grinding machines, which are the only machine tools ordinarily required to reproduce in their work the accuracy which is built into the tools themselves. Cylindrical grinders of the latest type, equipped with positive sizing devices, actually will produce repetitive work under production conditions within 0.0003-inch limits — a guarantee which would have been impossible even two years ago. Furthermore, work which used to come out with a dull surface, now carries a mirror finish and this at no loss of output.

Mr. Dunbar sees as one of the most spectacular results of the design efforts of the machine tool industry during the depression, the development of flexible designs which through interchangeable units enable hand-operated, semiautomatic and automatic grinders all to start out with identical base line assemblies, with conversion from one type to the other readily possible in the customer's plant if and when his needs require.

W. W. Tangeman, vice president, Cincinnati Milling Machine Co. and Cincinnati Grinders Inc., Cincinnati, touches on the human side of the machine tool problem when he says: "While we have in America a large number of high skilled craftsmen unequalled in any country in the world, there are not enough of these men to produce the quantities of quality products which the American standard of living demands. Modern machining processes and modern machine tools make it possible for the 'average' workman consistently to produce parts to extreme limits of accuracy. Modern machines are more foolproof in operation, and it is possible today to select machines for almost any manufacturing operation, the manipulation of which can be learned in a short time.

"An important though intangible by-product of the installation of new machinery is a vast improvement in the morale of the workmen. An interesting example came to the writer's attention a few days ago. A large motor car company placed a few new machines in a department that had not had any new equipment for a number of years. The effect of the new machines on the men and their

H. C. Pierle

Charles J. Stilwell

Eugene C. Clark

Harry S. Robinson

W. W. Tangeman

W. E. Whipp

C. N. Kirkpatrick

Roger N. Heald

supervisors was almost magical. By contrast, the old machinery looked out of place. It was immediately cleaned up, repaired, and repainted to make it more suitable company for the new machines. The whole department was rejuvenated. This is a perfectly natural reaction, and similar advantages can be gained in most shops by following this procedure." There certainly is a most effective answer to the charge that machines degrade men, as well as to the charge against machine tools of fostering unemployment.

As an example of the dependence of other industries upon the machine tool industry, Mr. Tangeman mentions the steel industry. To produce the high finish now demanded on steel sheets, it has been necessary to improve the surface of the rolls. This has been accomplished with the co-operation of machine tool builders who have developed roll grinding machines capable of giving the required mirror finish.

Howard W. Dunbar

August H. Tuechter

Hugo L. Olson

Tell Berna

Henry Buker

W. D. Creider

Speaking from his own fifty years of experience in the manufacture of drilling machines, August H. Tuechter, president, the Cincinnati Bickford Tool Co., Cincinnati stresses this one outstanding fact in connection with machine tools, which is "You pay for efficiency whether you have it or not." And he adds; "Why not have it"

As Mr. Tuechter sees the situation, the manufacturer who postpones the replacement of his obsolete or inefficient tools stands to lose:

1. Savings in production cost due to greater efficiency of the new machines.

2. Savings in wages necessary to obtain the expert operators required for older machines, as compared with operating requirements of a modern tool, built foolproof, and eliminating to some extent at least the need for skill and experience on the part of the workman.

3. Cost of delaying and upsetting production schedules by installing new equipment and making plant changes at a later, busier time.

4. Profits on sales lost because of insufficient plant capacities and extended deliveries which will later prevail. This last factor may force the purchase at a later time to be based on delivery rather than on quality and preference, with consequent sacrifice of efficiency.

5. Savings in the cost of new equipment which is likely to have advanced in price at the time when urgent need compels purchase.

6. Cost of repairs and overtime labor necessary to obtain required production with old equipment.

It is indeed a tribute to the prophetic powers of this "elder statesman" of the machine tool industry that since this statement was made in the summer, events have driven home the truth of several of Mr. Tuechter's assertions.

C. N. Kirkpatrick, secretary and sales manager, Landis Machine Co., Waynesboro, Pa., answers the question "When is a machine obsolete?" in this manner. "This," Mr. Kirkpatrick says, "depends entirely upon the design of the manufacturer's product, the quality he wishes to maintain, and the production desired. It may be that a change in design of any product and the stepping up of quality may obsolete a new machine tool after several months. The machine tool builder is keenly alive to any changes in the conditions of metalworking plants and therefore when an improved design of machine tool is required to meet the changed conditions, the machine tool manufacturer is prepared. There is, therefore, no definite period or no prescribed condition whereby anyone may say that a machine tool is obsolete.

"In our own experience, we have noted cases where a customer's costs were several hundred per cent higher with old thread cutting equipment than with new threading equipment, and at the same time the product was improved greatly. It is a simple matter for any user of machine tools to determine the value of replacing equipment."

H. C. Pierle, secretary and sales manager, R. K. Le Blond Machine Tool Co., Cincinnati, speaking in terms of lathes, shows what the machine tool industry has done for the automobile industry. At one time—and it was not many years ago—the production of a simple four-cylinder crankshaft required the attention of skilled lathe hands working under tool room conditions. To push production up to 250 crankshafts per day required at least 25 lathes and 25 operators working at least 18 hours per day. This battery occupied 4000 square feet of floor space.

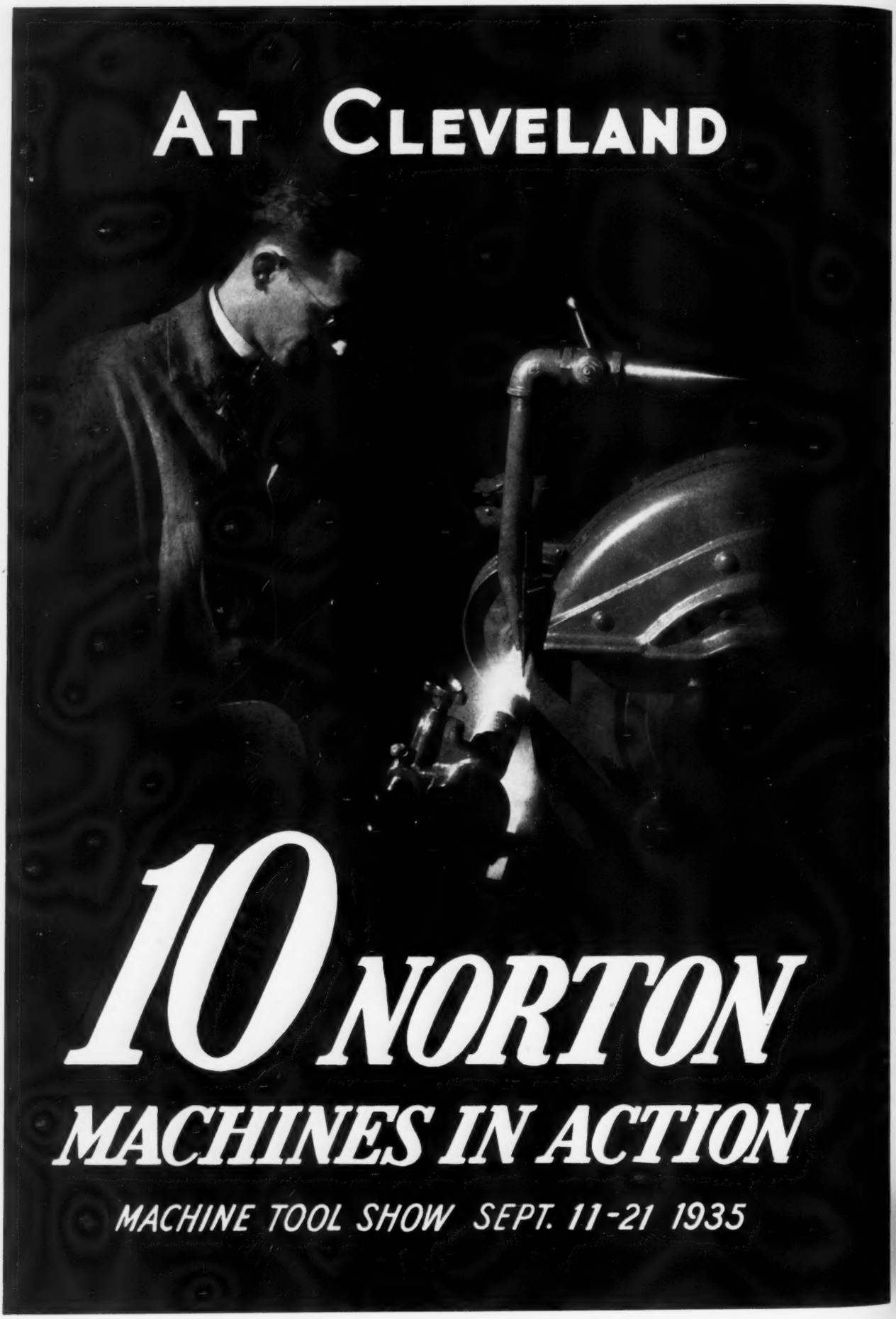
Today, a far more complicated and accurate six-cylinder crankshaft is produced at the rate of 250 units in 18 hours—this by the use of two machines requiring only two operators and occupying only 400 square feet of floor space. The original battery of 25 lathes cost about $75,000, while the new high production machines by which they are replaced cost altogether only $37,000.

Machine Tools for Investment

"The depression is over only for those who have renewed their hopes, their efforts, their product and—their equipment," says Harry S. Robinson, secretary, the Cincinnati Shaper Co., Cincinnati. Mr. Robinson analyzes the purchase of new plant equipment in this way: "The placing of surplus or reserve funds of a company calls for investment. Wise investment seeks security and yield. Generally speaking, price is a measure of security and you purchase not the lower priced bond, but the higher priced even at a sacrifice in yield. Now the purchase of mechanical equipment is just as much a capital investment as the purchase of bonds. Why then hope to find security accompanying low prices in machine tools more often than in bonds? However, there is one happy difference between the investment in securities and the investment in machinery—there is no sacrifice in yield. Carefully selected equipment naturally means security. Efficiency in operation returns a greater yield."

Roger N. Heald, president, Heald Machine Co., Worcester, Mass., points to recent developments in bore, cylinder and centerless grinding technique which is of deep significance in the higher development of electric refrigerators, diesel engines, sewing machines, etc., at the same time making substantial cuts in production costs. He mentions in particular a new centerless grinder

(*Please turn to Page* 131)


AT CLEVELAND
10 NORTON
MACHINES IN ACTION
MACHINE TOOL SHOW SEPT. 11-21 1935

Three Type C Cylindrical Grinders

A 6" Semi-automatic, a 6" Hydraulic Traverse and a 10" Hydraulic Traverse . . . All with spindles end-driven by multiple vee belts from motors mounted on wheel slides . . . All with forced-feed lubricated ways . . . All with flood lubricated spindle bearings.

Two Automotive Grinders

A crankpin grinder—the D-86, and a cam contour grinder—the Cam-O-Matic . . . Both have forced-feed lubricated ways and flood lubricated spindles end-driven by multiple vee belts from motors mounted on their wheel-slides. Two high-production grinders designed especially for the automotive industry.

Two Universal Tool and Cutter Grinders

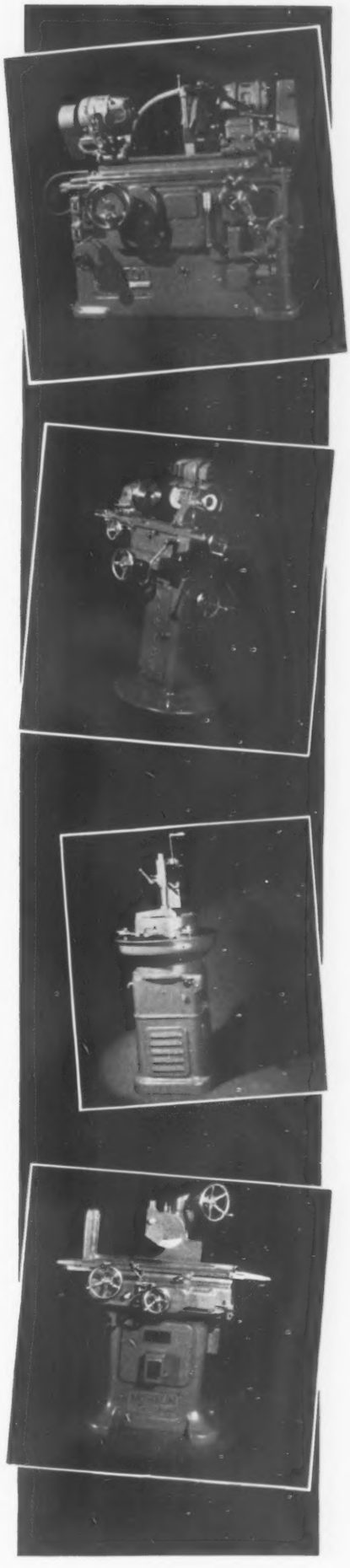
A No. 1 with 10" swing and a No. 2 with 12" swing, the latter having hydraulically operated table traverse . . . Both have cartridge type wheel spindles and a wide variety of optional equipment for accommodating the many diversified jobs in the modern tool room.

Two Lapping Machines

A No. 10-U with cast iron laps for both cylindrical and flat work and which uses abrasive flour mixed with a suitable vehicle . . . A No. 24 or HYPROLAP for either flat or cylindrical work; uses bonded abrasive laps and is hydraulically operated.

A Small Surface Grinder

Hydraulically operated with cartridge type wheel spindle, automatic cross-feed and equipped for wet grinding . . . This machine can be arranged for dry grinding or with integral motor spindle if desired . . . One operation being shown will be the grinding of cemented tungsten-carbide using Norton Diamond Wheels.



NORTON
GRINDING & LAPPING
MACHINES

NORTON COMPANY, WORCESTER, MASS.
New York Chicago Hartford Detroit London Cleveland

M-343

CLEVELAND READY FOR NATIONAL MACHINE TOOL SHOW

A new and unusual view of Cleveland's terminal development as seen from the west. At the left is the central span of the high level bridge. The white building immediately in front of Terminal Tower is the recently completed postoffice

FIVE and one-half acres of machine tools and allied equipment, constituting the world's largest machine shop, set up and operating in Cleveland's Public Auditorium during the Third National Machine Tool exposition, Sept. 11-21, will reflect the notable progress made in this field in the past six years. The first exposition of this kind was held in Cleveland in 1927 and the second in the same city in the fall of 1929.

An exposition had been planned for 1932, but economic reasons forced its postponement until industrial conditions became more favorable. The choice of 1935 for the third show is proving to be a happy one, for during recent months the machine tool manufacturing industry is enjoying a substantial uplift in orders, which gives it the distinction of being the first of the durable goods industries to throw off the shackles of depression. The figures of the National Machine Tool Builders' association for July show that unfilled orders, which are mounting rapidly, now aggregate about twice the present rate of shipments. This situation gives rise to the belief that other major industries soon will feel the same expansion influence, thereby creating a growing demand for machine tools and other productive equipment.

Many New Designs Offered

In periods of prosperity, machine tool builders usually are so busy filling orders for existing machines that they have little opportunity to build and try out new designs. During the depresson years, designers have had the time to translate into iron and steel the refinements in tools and new ideas which they had developed in the late 1920's. As a result, the improvement in design, capacity and precision of tools during the last six years has exceeded the cumulative advances of the preceding 20 years.

The purpose of the 1935 National Machine Tool show, therefore, is to acquaint the manufacturing world with the greater efficiency of the new tools and equipment. The industry has taken steps to see that the show

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Vice President and Treasurer, Gisholt Machine Co., Madison, Wis.

HENRY C. PIERLE
Secretary and Sales Manager, R. K. Le Blond Machine Tool Co., Cincinnati

will be well attended. As a result, it is conservatively estimated that between 25,000 and 30,000 industrial executives, bankers, engineers and mechanics, will come to Cleveland to see modern producing equipment in action.

For the 1935 Machine Tool show, probably correctly publicized as the largest industrial exposition ever to be held in the United States, credit for organization and handling must be given to the officers and exposition committee of the National Machine Tool Builders' association, which has sponsored all three shows. These officers and committeemen have labored for many months in making plans and arranging details. The personnel of the officers and committee are listed elsewhere on these pages. Active management of the exposition is in the capable hands of Roberts Everett Associates Inc., New York, who successfully managed the two previous shows.

Larger Than Previous Show

In point of size, the coming exposition will be 50 per cent larger than the one held in 1929. Included in the exhibits will be more than 900 metalworking machines of about 600 different types, as well as hundreds of small tools, gages and other accessories necessary to machine tool operation. Total value of the exhibits is estimated at approximately $4,000,000, with three-fourths of this amount being represented in machine tools. Total weight of all equipment will aggregate about 2500 tons. Some 400 freight cars will be required to transport the equipment to Cleveland from 16 states and 76 cities for installation beginning Sept. 2.

Approximately 250 companies have engaged exhibit space in the show which will tax the capacity of Cleveland's fine Public Auditorium and connecting Exposition Hall. Of

Direct Activities of Machine Tool Builders

Officers of the National Machine Tool Builders' Association for 1935. Top row, left to right: Norman D. MacLeod, first vice president; Charles J. Stilwell, president; Clayton R. Burt, second vice president. Bottom row, left to right: Herbert H. Pease, treasurer; Herman H. Lind, general manager; Frida F. Selbert, secretary

the total number of exhibitors, over 100 are machine tool builders, members of the National Machine Tool Builders' association, and about 150 are accessory manufacturing companies.

A large proportion of the machine tools will be in operation and actually cutting or processing metals, thereby affording performance closely simulating shop practice. To give some idea of the size of the show, it can be pointed out that 5000 kilowatts of electricity will be required to carry the hourly load when the machines are under power. This power is sufficient to supply an entire city of 30,000 to 35,000 population; it was necessary for Public Auditorium to provide additional power service to meet this unusual demand. All machine tools exhibited will be finished in standard machine tool gray, now known the world

Program for Machine Tool Congress

Wednesday Evening, Sept. 11

I

HOTEL STATLER BALLROOM

Under Direction of Machine Shop Practice Division, American Society of Mechanical Engineers

8:00 p.m.—Presiding: Philip E. Bliss, president, Warner & Swasey Co., Cleveland.
"Opening Remarks," by C. R. Burt, president, Pratt & Whitney Co., Hartford, Conn.; chairman of Machine Tool Congress.
"Surface Finishing by Cylindrical Grinding," (illustrated), by Howard W. Dunbar, manager, grinding machine division, Norton Co., Worcester, Mass.
"Internal Surface Finishing," by A. W. Schneider, Heald Machine Co., Worcester, Mass.

Thursday Evening, Sept. 12

II

HOTEL STATLER BALLROOM

Under Direction of Machine Shop Practice Division, American Society of Mechanical Engineers

6:30 p.m.—Informal dinner. Presiding: McRae Parker, director of education, Cleveland Public Schools; chairman, Cleveland Section, American Society of Mechanical Engineers.
Address: "Machine Shops in Nazi Germany," by Kenneth H. Condit, editor, *American Machinist*, New York.

III

8:00 p.m.—Presiding: James H. Herron, consulting engineer, Cleveland.
"Present Status of Cemented Carbide and Other Cutting Materials," by Roger D. Prosser, Thomas Prosser & Son, New York.
"Metal Cutting Research," by Hans Ernst, research director, Cincinnati Milling Machine Co., Cincinnati. Will show chip formation under microscope as recorded by motion picture camera.

Friday Evening, Sept. 13

IV

HOTEL STATLER BALLROOM

Under direction of American Society of Tool Engineers

6:30 p.m.—Informal dinner, music and entertainment. Presiding: R. M. Lippard, Detroit manager, Heald Machine Co.; president, American Society of Tool Engineers.
8:00 p.m.—"Standardization of Machine and Tool Data," by William H. Smila, master mechanic, Jefferson plant, Chrysler Corp., Detroit. Will cover requirements of tool engineers, tool specifiers and tool designers when specifying and tooling a machine for production.
"Latest Developments in the Metal Cutting Tool and Gage Field," by A. H. d'Arcambal, consulting metallurgist, Pratt & Whitney Co., Hartford, Conn. Will feature the latest developments in hardening practice as well as discussion on important developments in gaging practice.

Monday Evening, Sept. 16

V

PUBLIC AUDITORIUM MUSIC HALL

Under Direction of Cleveland Engineering Society

8:00 p.m.—Presiding: Joseph H. Gepfert, district manager, Reeves Pulley Co., Cleveland; president, Cleveland Engineering Society.
"Look to the Foreman," by W. S. Knudsen, vice president, General Motors Corp., Detroit.

Tuesday Evening, Sept. 17

VI

CLEVELAND ENGINEERING SOCIETY ROOMS, HANNA BUILDING

Under Direction of Cleveland Engineering Society

8:00 p.m.—Presiding: L. E. Jermy, editor, *Machine Design*, Cleveland.
"Tomorrow's Machine Tools," by Guy Hubbard, consulting engineer, Cleveland.

Tuesday Evening, Sept. 17

VII

UNION CLUB

Under Direction of National Machine Tool Builders' Association

7:00 p.m.—Formal dinner (by invitation) in honor of overseas visitors to Exposition and Congress. Presiding: F. H. Chapin, president, National Acme Co., Cleveland.

Wednesday Evening, Sept. 18

VIII

HOTEL STATLER BALLROOM

Under Direction of Production Activity, Society of Automotive Engineers

8:00 p.m.—Presiding: Joseph Geschelin, Detroit technical editor, *Automotive Industries*.
"Methods of Finishing Transmission Gears" (illustrated), by S. O. White, chief engineer, and Marley Hedgeland, gear development engineer, Warner Gear Co., Muncie, Ind.
"Application of Induction Heating in Automotive Production" (illustrated), by E. L. Bailey, electrical engineer, Dodge division, Chrysler Corp., Detroit.
"Rustproofing and Paint Adherence Technique," by E. P. Spruance, American Chemical Paint Co., Ambler, Pa.
"Resistance Welding in the Automotive Industry" (illustrated), by J. A. Weiger, P. R. Mallory & Co., Indianapolis.
"A Quick Trip to the Machine Tool Exhibits," by John R. Cox, director of manufacturing, Thompson Products Inc., Cleveland.

Thursday Evening, Sept. 19

IX

HOTEL STATLER BALLROOM

Under Direction of Cleveland Section, Society of Automotive Engineers

7:00 p.m.—Production dinner (informal). Toastmaster: V. P. Rumely, Hudson Motor Car Co., Detroit.
8:15 p.m.—Presiding: A. T. Colwell, director of engineering, Thompson Products Inc., Cleveland.
Address: "Where Are We Going from Here?" by William B. Stout, president, Stout Engineering Laboratories, Dearborn, Mich.; president; Society of Automoive Engineers.

Friday Evening, Sept. 20

X

HOTEL STATLER LATTICE ROOM

Business Meeting of Machine Tool Congress

8:00 p.m.—Presiding: C. R. Burt, president, Pratt & Whitney Co., Hartford, Conn.; chairman, Machine Tool Congress.
Reports of officers.
Report of nominating committee and election of officers.

over as the color of modern American "Master Tools of Industry."

In addition to the broad domestic attendance at the show, a widespread foreign interest is indicated. Representation is coming particularly from England, France, Germany, Italy, Japan, Russia and Czechoslovakia. These overseas visitors will be the guests of the National Machine Tool Builders' association at an invitational dinner at the Union club on Tuesday evening, Sept. 17. F. H. Chapin, president, National Acme Co., Cleveland, will officiate on this occasion.

Typical of interest being shown

(*Please turn to Page* 88)

Exposition Committee

NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION

Chairman

W. P. KIRK
Vice President, Pratt & Whitney Co.,
Hartford, Conn.

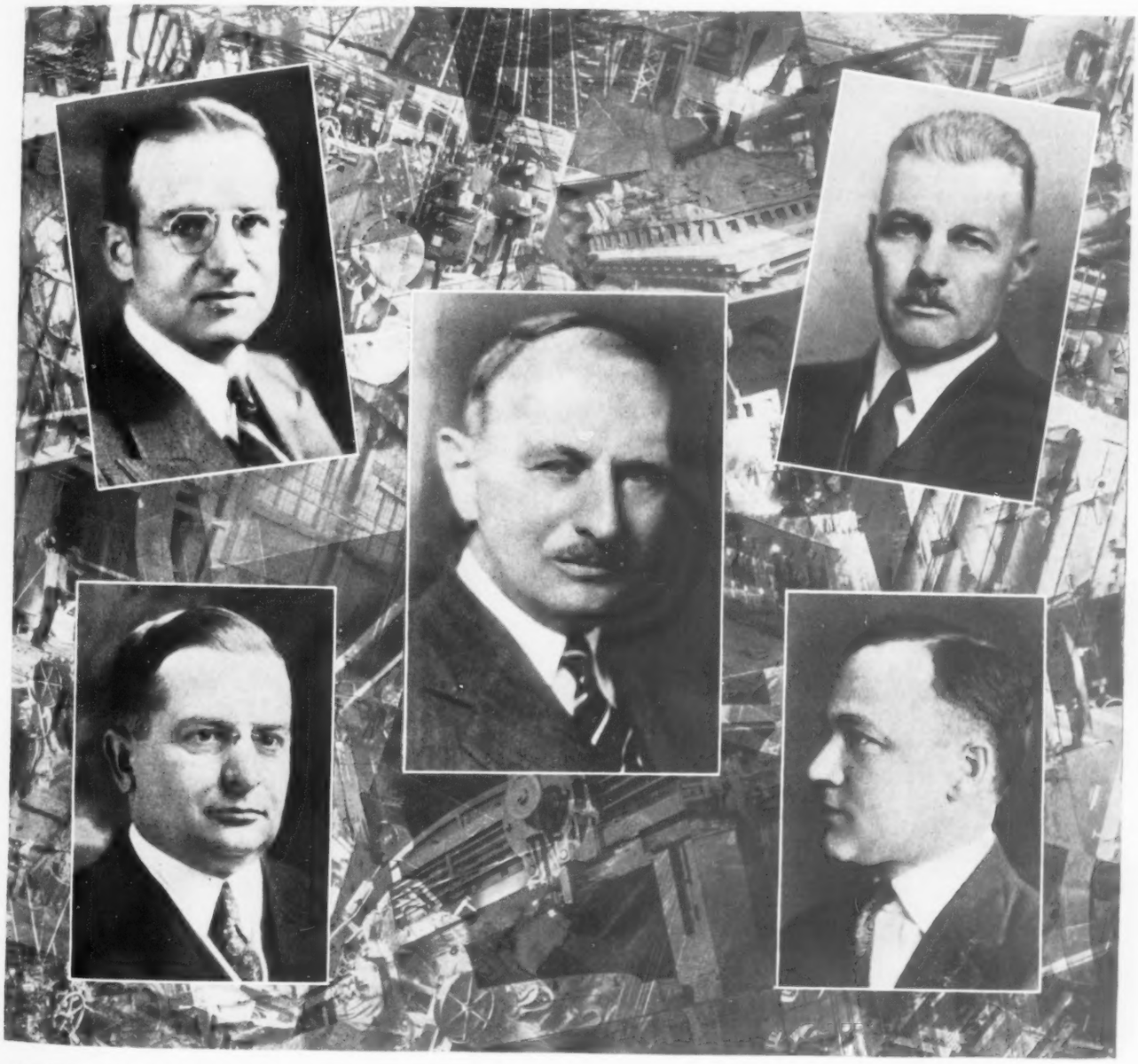
GEORGE L. ERWIN JR.
Sales Manager, Kearney & Trecker Corp., Milwaukee

J. G. HEY
Vice President, Avey Drilling Machine Co., Cincinnati

NORMAN D. MACLEOD
President, Abrasive Machine Tool Co., East Providence, R. I.

W. E. WHIPP
President, Monarch Machine Tool Co., Sidney, O.

General Staff of 1935 Machine Tool Exposition



The Third National Machine Tool Show is under the general direction of the Exposition Committee of the National Machine Tool Builders' Association. (Upper left)—George L. Erwin Jr. (Upper right)—Norman D. MacLeod. (Center)——W. P. Kirk, chairman. (Lower left)—J. G. Hey. (Lower right)—W. E. Whipp

Exhibitors in National Machine Tool Show

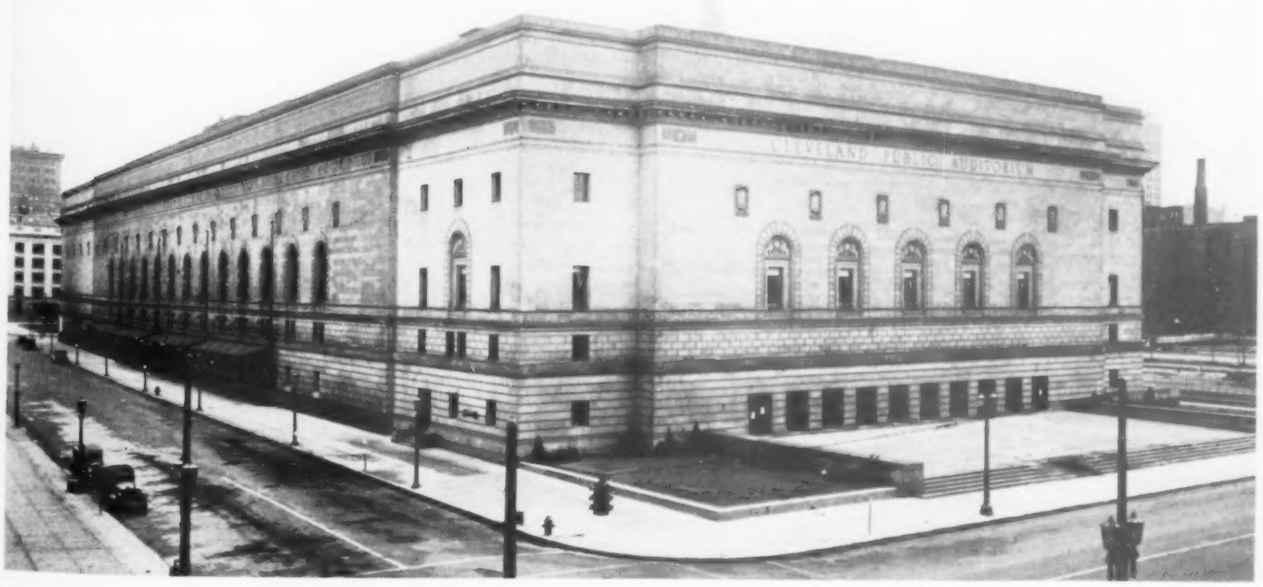
Public Auditorium, Cleveland, Sept. 11-21

Exposition Hours: 9:00 A.M. to 6:00 P.M. Exposition Closed Sunday, Sept. 15

Exhibitor	Booth No.
A	
ABRASIVE INDUSTRY, Cleveland	A-3
Abrasive Machine Tool Co., East Providence, R. I.	405
Acme Machine Products Co. Inc., Muncie, Ind.	A-312
Acme Machinery Co., Cleveland	311
Acme Machine Tool Co., Cincinnati	109-a
Ahlberg Bearing Co., Chicago	E-301
Air Reduction Sales Co., New York	A-412
Ajax Mfg. Co., Cleveland	F
Charles G. Allen Co., Barre, Mass	15
Allis-Chalmers Mfg. Co., Milwaukee	E-401
Louis Allis Co., Milwaukee	E-411
American Broach & Machine Co., Ann Arbor, Mich.	1005
American Chain Co. Inc., Wright Mfg. Division, Bridgeport, Conn.	A-305
American Tool Works Co., Cincinnati	901
Armstrong Bros. Tool Co., Chicago	A-304
Arter Grinding Machine Co., Worcester, Mass.	108
Associated Machine Tool Dealers	L
Avey Drilling Machine Co., Cincinnati	18
B	
Baker Bros. Inc., Toledo, O.	307-b
Baker-Raulang Co., Cleveland	E-212
Barber-Colman Co., Rockford, Ill.	903
Barnes Drill Co., Rockford, Ill.	201
W. F. & John Barnes Co., Rockford, Ill.	304-a
Barrett-Cravens Co., Chicago	E-501
Leon J. Barrett Co., Worcester, Mass.	A-408
John Bath & Co. Inc., Worcester, Mass.	A-101
Bausch & Lomb Optical Co., Rochester, N. Y.	A-309
Charles H. Besly & Co., Chicago	1
Black & Decker Mfg. Co., Towson, Md.	E-101
G. S. Blakeslee & Co., Chicago	E-202
Blanchard Machine Co., Cambridge, Mass.	309
Bridgeport Safety Emery Wheel Co., Bridgeport, Conn.	25
Bristol Co., Waterbury, Conn.	A-303
Brown & Sharpe Mfg. Co., Providence, R. I.	27
Bryant Chucking Grinder Co., Springfield, Vt.	203
Buckeye Portable Tool Co., Dayton, O.	A-407
Buffalo Forge Co., Buffalo	111
Buhr Machine Tool Co., Ann Arbor, Mich.	308
Bullard Co., Bridgeport, Conn.	205
Bunting Brass & Bronze Co., Toledo, O.	A-208
C	
Carborundum Co., Niagara Falls, N. Y.	E-408
Carborundum Co., Hutto Machine Division, Detroit	22-a
Carlton Machine Tool Co., Cincinnati	904
Carpenter Steel Co., Reading, Pa.	A-501
Century Electric Co., St. Louis	A-405
Chicago Belting Co., Chicago	A-502
Cincinnati Bickford Tool Co., Cincinnati	406
Cincinnati Grinders Inc., Cincinnati	207
Cincinnati Lathe & Tool Co., Cincinnati	11
Cincinnati Milling Machine Co., Cincinnati	207
Cincinnati Shaper Co., Cincinnati	603
Cleveland Automatic Machine Co., Cleveland	20
Cleveland Hobbing Machine Co., Cleveland	301
Cleveland Twist Drill Co., Cleveland	E-306
Cleveland Worm & Gear Co., Cleveland	A-105
Clipper Belt Lacer Co., Grand Rapids, Mich.	A-415
Colt's Patent Fire Arms Mfg. Co., Autosan Machine Division, Hartford, Conn.	E-210
Commercial Investment Trust Inc., New York	S-3
Cone Automatic Machine Co. Inc., Windsor, Vt.	A-B
Crucible Steel Co. of America, New York	A-506
Cushman Chuck Co., Hartford, Conn.	E-410
Cutler-Hammer Inc., Milwaukee	E-201
D	
Davenport Machine Tool Co., Rochester, N. Y.	1006
Dayton Rogers Mfg. Co., Minneapolis	A-207
Dayton Rubber Mfg. Co., Dayton, O.	A-504
DeVlieg Milling Machine Co., Jackson, Mich.	8
DeWalt Products Corp., Lancaster, Pa.	A-403
Diamond Machine Co., Providence, R. I.	605
Dreses Machine Tool Co., Cincinnati	26
E	
Eastern Machine Screw Corp., New Haven, Conn.	900
Elwell-Parker Electric Co., Cleveland	E-402
Erie Foundry Co., Erie, Pa.	22
Euclid Electric & Mfg. Co., Euclid, O.	A-202
Ex-Cell-O Aircraft & Tool Corp., Detroit	812
F	
Fafnir Bearing Co., New Britain, Conn.	E-312
Fairbanks, Morse & Co., Chicago	A-215
Farrel-Birmingham Co. Inc., Buffalo	105-a
Federal Products Corp., Providence, R. I.	E-502
Fellows Gear Shaper Co., Springfield, Vt.	305
Firth-Sterling Steel Co., McKeesport, Pa.	A-206
Foote-Burt Co., Cleveland	912
Ford Motor Co., Johansson Division, Dearborn, Mich.	A-201
Fosdick Machine Tool Co., Cincinnati	1004
Foster Machine Co., Elkhart, Ind.	200
Fostoria Pressed Steel Corp., Fostoria, O.	A-411
Fulton Foundry & Machine Co. Inc., Cleveland	A-212
G	
Gallmeyer & Livingston Co., Grand Rapids, Mich.	307
General Electric Co., Schenectady, N. Y.	E-206
Geometric Tool Co., New Haven, Conn.	103
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.	110
Gisholt Machine Co., Madison, Wis.	112
Gits Bros. Mfg. Co., Chicago	A-406
Gleason Works, Rochester, N. Y.	811
Gogan Machine Corp., Cleveland	A-211
George Gorton Machine Co., Racine, Wis.	H
Goss & De Leeuw Machine Co., New Britain, Conn.	1008
Gould & Eberhardt, Newark, N. J.	E
G. A. Gray Co., Cincinnati	1012
Green Bay Barker Machine & Tool Works, Green Bay, Wis.	4-a
Greenerd Arbor Press Co., Nashua, N. H.	E-506
Greenlee Bros. & Co., Rockford, Ill.	902
H	
Hall Planetary Co., Philadelphia	14
Hannifin Mfg. Co., Chicago	104
Hanson-Whitney Machine Co., Hartford, Conn.	404
Harnischfeger Corp., Milwaukee	E-504
Heald Machine Co., Worcester, Mass.	206
Hendey Machine Co., Torrington, Conn.	402
Henry & Wright Mfg. Co., Hartford, Conn.	E-308
Hobart Bros., Troy, O.	E-103
Hoefer Mfg. Co. Inc., Freeport, Ill.	12
E. F. Houghton & Co., Philadelphia	E-204
Hyatt Roller Bearing Co., Harrison, N. J.	A-409
Hydraulic Press Mfg. Co., Mount Gilead, O.	1014
I	
Illinois Tool Works, Chicago	303
Ingersoll Milling Machine Co., Rockford, Ill.	810
International Nickel Co. Inc., New York	A-505
J	
Charles L. Jarvis Co., Gildersleeve, Conn.	E-203
Jones & Lamson Machine Co., Springfield, Vt.	607
K	
Kearney & Trecker Corp., Milwaukee	400
Kent-Owens Machine Co., Toledo, O.	105
F. A. Kershaw, Kent, O.	A-314
King Machine Tool Co., Cincinnati	910
Kingsbury Machine Tool Corp., Keene, N. H.	1009
W. B. Knight Machinery Co., St. Louis	19
L	
Lake City Malleable Co., Cleveland	E-213
Landis Machine Co., Waynesboro, Pa.	204
Landis Tool Co., Waynesboro, Pa.	J-K
Lapointe Machine Tool Co., Hudson, Mass.	D
R. K. LeBlond Machine Tool Co., Cincinnati	1001
Lehmann Machine Co., St. Louis	313
Leland-Gifford Co., Worcester, Mass.	403
Lincoln Electric Co., Cleveland	E-310
Link-Belt Co., Chicago	E-302
Lodge & Shipley Machine Tool Co., Cincinnati	1013
Logansport Machine Co., Logansport, Ind.	313
Lucas Machine Tool Co., Cleveland	202
Lufkin Rule Co., Saginaw, Mich.	A-302

Exhibitor	Booth No.
M	
MACHINE DESIGN, Cleveland	A-3
Macklin Co., Jackson, Mich.	A-416
Madison-Kipp Corp., Madison, Wis.	E-208
Marlin-Rockwell Corp., Jamestown, N. Y.	E-200
Master Tool Co. Inc., Cleveland	A-306
Mattison Machine Works, Rockford, Ill.	302
Micromatic Hone Corp., Detroit	E-205
Monarch Machine Tool Co., Sidney, O.	813
Morse Chain Co., Ithaca, N. Y.	A-210
Motor Improvements Inc., Newark, N. J.	A-402
Murchey Machine & Tool Co., Detroit	209
N	
National Acme Co., Cleveland	601
National Machinery Co., Tiffin, O.	23-a
New Britain-Gridley Machine Co., New Britain, Conn.	909
New Departure Mfg. Co., Bristol, Conn.	E-406
Norma-Hoffmann Bearings Corp., Stamford, Conn.	A-401
Norton Co., Grinding Machine Division, Worcester, Mass.	101
O	
Oakite Products Inc., New York	A-103
Ohio Machine Tool Co., Kenton, O.	13
Oilgear Co., Milwaukee	5
O. K. Tool Co. Inc., Shelton, Conn.	A-313
Oliver Instrument Co., Adrian, Mich.	208
Oster Mfg. Co., Cleveland	7
P	
Parker Appliance Co., Cleveland	A-308
C. F. Pease Co., Chicago	A-104
Peerless Machine Co., Racine, Wis.	4
Pellow Machine Co., Detroit, Mich.	E-405
Penton Publishing Co., Cleveland	A-3
Porter-Cable Machine Co., Syracuse, N. Y.	307-c
Potter & Johnston Machine Co., Pawtucket, R. I.	602
Power Transmission Council, New York	E-214
Pratt & Whitney Co., Hartford, Conn.	906
Producto Machine Co., Bridgeport, Conn.	307-a, A-301
Thomas Prosser & Son, New York	E-105
R	
Racine Tool & Machine Co., Racine, Wis.	106
Reed-Prentice Corp., Worcester, Mass.	C
Reeves Pulley Co., Columbus, Ind.	E-209
Rivett Lathe & Grinder Inc., Boston	1010
Robbins & Myers Inc., Springfield, O.	A-214
Rockford Machine Tool Co., Rockford, Ill.	310
Rockwood Mfg. Co., Indianapolis	E-414
Rotor Air Tool Co., Cleveland	E-314
S	
William Sellers & Co. Inc., Philadelphia	401
Seneca Falls Machine Co., Seneca Falls, N. Y.	914

Exhibitor	Booth No.
Sidney Machine Tool Co., Sidney, O.	1011
S K F Industries Inc., Philadelphia	A-102
Skinner Chuck Co., New Britain, Conn.	E-400
Springfield Machine Tool Co., Springfield, O.	800
Square D Co., Detroit	A-213
Standard Oil Co., Chicago	S-4
Standard Pressed Steel Co., Jenkintown, Pa.	E-211
Standard Tool Co., Cleveland	E-303
L. S. Starrett Co., Athol, Mass.	A-203
STEEL, Cleveland	A-3
Sterling Grinding Wheel Co., Tiffin, O.	A-205
D. A. Stuart & Co., Chicago	E-503
Sundstrand Machine Tool Co., Rockford, Ill.	306
Sun Oil Co., Philadelphia	E-505
Sunnen Products Co., St. Louis	A-413
Synthane Corp., Oaks, Pa.	A-404
T	
Taft-Peirce Mfg. Co., Woonsocket, R. I.	A-307
Taylor & Fenn Co., Hartford, Conn.	604
Thompson Grinder Co., Springfield, O.	24
Timken Roller Bearing Co., Canton, O.	E-500
Tinus Olsen Testing Machine Co., Philadelphia	A-503
Toledo Pipe Threading Machine Co., Toledo, O.	108-C
Toledo Scale Co., Toledo, O.	E-309
Tuthill Pump Co., Chicago	A-204
Twin Disc Clutch Co., Racine, Wis.	E-404
Tyson Roller Bearing Co., Massillon, O.	A-216
U	
Union Mfg. Co., New Britain, Conn.	A-311
United States Electrical Tool Co., Cincinnati	102
Universal Boring Machine Co., Hudson, Mass	304
V	
Vanadium-Alloys Steel Co., Pittsburgh	E-102
Van Norman Machine Tool Co., Springfield, Mass.	913
Vickers Inc., Detroit	E-412
V & O Press Co., Hudson, N. Y.	E-315
W	
O. S. Walker Co. Inc., Worcester, Mass	3
Warner & Swasey Co., Cleveland	905
Wellman Bronze & Aluminum Co., Cleveland	A-316
Wesson Co., Detroit	A-209
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.	E-304
Whitney Mfg. Co., Hartford, Conn.	A-315
Whitney Metal Tool Co., Rockford, Ill.	16
Wiedemann Machine Co., Philadelphia	E-313
J. H. Williams & Co., New York	A-410
Wilson Mechanical Instrument Co., New York	E-104
Y	
Yale & Towne Mfg. Co., Philadelphia	E-100



Cleveland Public Auditorium and connecting underground Exposition Hall, affording approximately 5½ acres of exhibit space, will house the 1935 National Machine Tool Show. All of this space will be required to accommodate the 250 exhibits

BALL BEARING IDEAS . . .

by New Departure Engineers

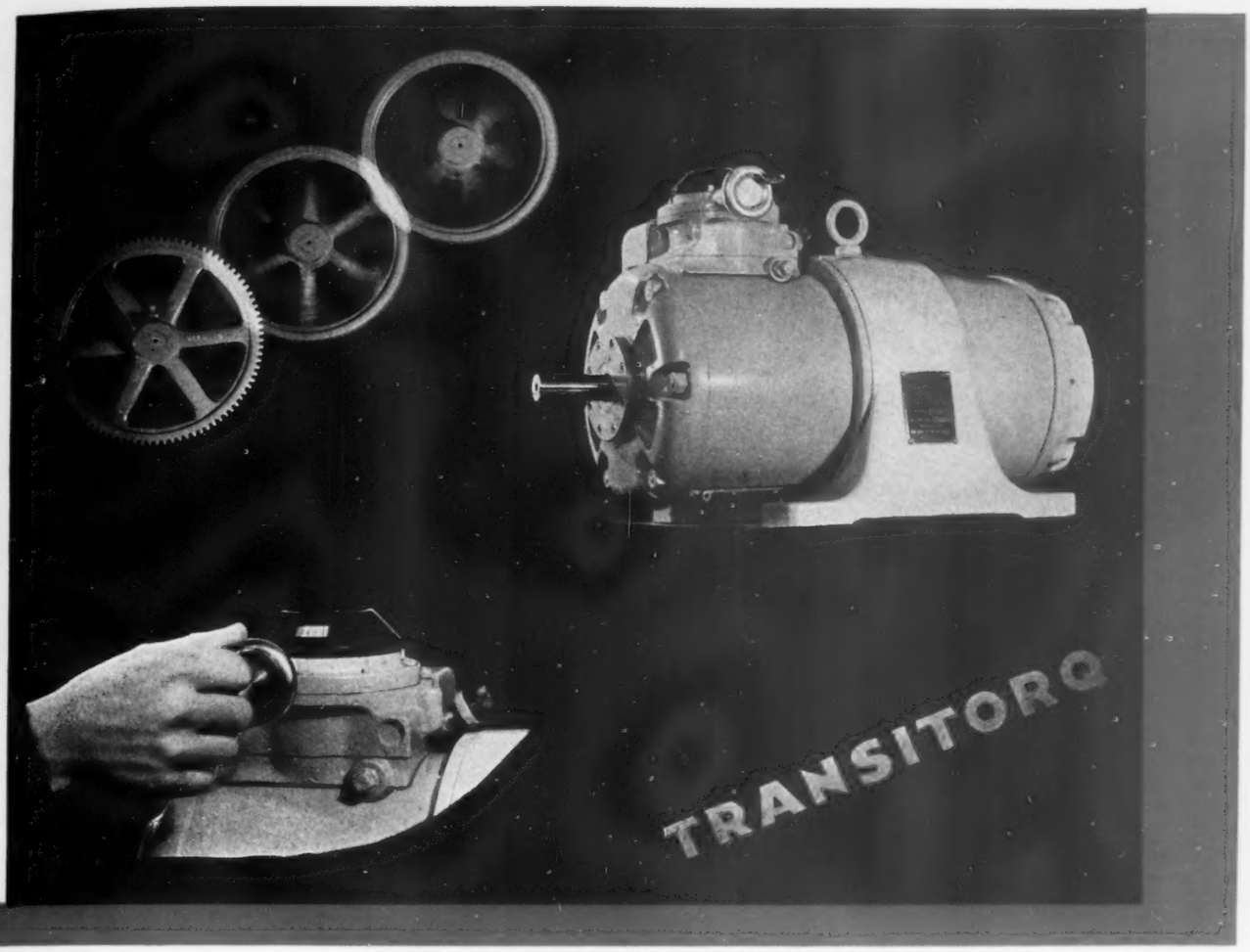
TO use the best ball bearing obtainable does not alone assure the utmost in bearing performance. The installation must be backed by ceaseless research, experience and *ideas*.

New Departure engineers have the faculty of applying to a given job installation *ideas* that often suggest means of cutting manufacturing costs as well as improving bearing and machine performance.

Examples of such work form the subject of a booklet that will be distributed in the New Departure space (E-406) at the Machine Tool Show. If you do not have an opportunity to visit us at Cleveland, we will gladly mail you a copy of this booklet, "Ball Bearing Ideas by New Departure Engineers."

The New Departure Manufacturing Company, Bristol, Conn. Branches at Detroit, Chicago, San Francisco and London, England.

NEW DEPARTURE
BALL BEARINGS



THOUSANDS OF SPEEDS . . .

at the touch of a finger

NOW, for the first time, *infinite* speed change becomes available at the touch of a finger — the flash of a light — or the passing of time.

Not only is the Transitorq a transmission whose speed is *infinitely adjustable* over a wide range — but its marvelous ease of speed control — immediate or remote, manual or automatic — presages a revolutionary advancement in increased production and lower costs in every industry.

A positive drive under all conditions. Desired speed may be selected before starting or changed by fingertip control while running.

Automatically returns to low-speed, high-torque starting position whenever stopped. Accelerating time to preselected speed is adjustable.

Built as a compact unit with any make of motor. Adaptable to any mounting position —vertical or horizontal, sidewall or floor.

Catalog PS upon request. The New Departure Mfg. Co., Bristol, Conn., a division of General Motors.

NEW DEPARTURE
Variable Speed
TRANSITORQ

Cleveland Is Ready for Machine Tool Show

(*Concluded from Page* 83)

in the exposition are the arrangements which special groups and large industrial companies are making to send representations for one or more days. The American Society of Tool Engineers has chartered the steamer GREATER DETROIT to take about 1200 of its members from Detroit to Cleveland to arrive on Friday, Sept. 13. This day at the show, consequently, has been designated as "A. S. T. E. Day." On the evening of this day, the society will meet in a banquet and technical session at Hotel Statler.

Arrive by Special Train

Philadelphia Machinery Distributors have arranged with the Pennsylvania railroad for a special air-conditioned train to arrive in Cleveland on Tuesday morning, Sept. 17. This train will be parked near Public Auditorium for three full days and will be provided with every convenience for use as hotel and club during the stay in Cleveland.

One industrial company has chartered two pullman cars to take a group of its shop men to the show. Other companies are sending their important executives, production and mechanical superintendents and foremen to the show in relays. Friday, Sept. 20, has been designated "Railroad Day" in honor of the many railroad officials and maintenance men who plan to attend. Several exhibitors will have on hand that day car parts upon which will be demonstrated the operation of modern machine tools.

Will Hold Tool Congress

As in the case of the two previous Machine Tool expositions, a National Machine Tool congress will be conducted with the 1935 show. More extensive than previous congresses, the present one will embrace ten sessions, all to be held during evenings so as not to conflict with the show. A fine array of addresses and technical papers has been scheduled for these sessions. The detailed program for the congress will be found on Page 82.

This congress has been arranged under the joint sponsorship of the National Machine Tool Builders' association; Machine Shop Practice division, American Society of Mechanical Engineers; Production Activity, Society of Automotive Engineers; American Society of Tool Engineers; and Cleveland Engineering society.

A complete list of exhibitors in the Machine Tool Show, giving locations of their exhibits, appears on Pages 84 and 85.

STEEL at the Tool Show

THROUGHOUT the National Machine Tool Exposition, STEEL will maintain headquarters in Booth A-3, which will be outfitted as a restroom for the convenience of visitors. Publications of the Penton Publishing Co., including STEEL, *Daily Metal Trade*, *The Foundry*, *Abrasive Industry* and *Machine Design*, will be available here. Representatives of the editorial staff of STEEL will be E. L. Shaner, editor; E. C. Kreutzberg, engineering editor; and E. F. Ross, J. D. Knox and A. H. Allen, associate editors. The business staff will be represented by G. O. Hays, business manager; John Henry, advertising manager; R. T. Mason, circulation manager; R. C. Jaenke, Cleveland; S. H. Jasper, Pittsburgh; L. C. Pelott, Chicago; E. W. Kreutzberg, New York; and J. F. Ahrens, New York. The Penton Publishing Co. will be represented by C. J. Stark, president and treasurer; and J. D. Pease, executive vice president.

—*Photo by Barnhill-Butler*

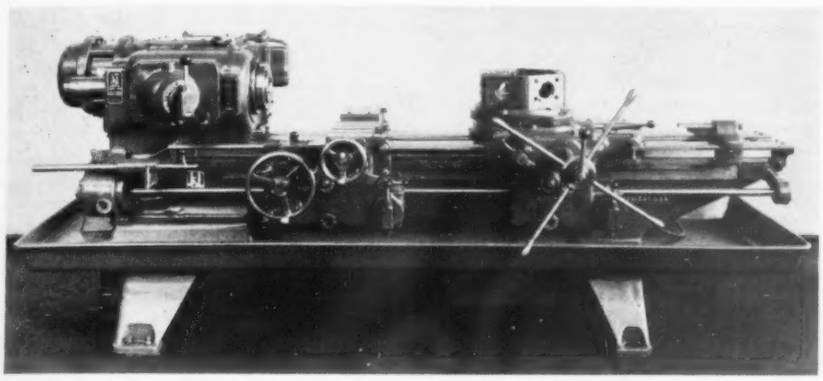
Looking south over downtown Cleveland from the air. Immediately in the foreground is the Cleveland Stadium. Public Auditorium can be seen slightly to the left in the center of the illustration. The underground Exposition Hall occupies the area between the north end of Public Auditorium and the most easterly bridge approach to the Stadium

NEW EQUIPMENT—

Many Types and Models Are Making Their First Appearance At 1935 National Machine Tool Exposition in Cleveland

Saddle Type Turret Lathes—

Jones & Lamson Machine Co., Springfield, Vt., is announcing a new line of saddle-type turret lathes built in a 2½ inch bar capacity and fitted with 12-inch chucks when used for chuck work. Features of the new machines, one of which is shown herewith, include single lever speed and feed selectors with direct-reading dials; 12 spindle speeds forward and reverse; all variable speeds obtained through sliding gears mounted on multiple splined shafts; all gears and shafts in headstock hardened, and all shafts mounted on antifriction bearings. The main spindle is the flanged type with a taper pilot and is mounted on antifriction bearings set up under a predetermined load. All wiring for the machines is built into the headstock, with the control panel located near the operating position.



The bed of this Jones & Lamson saddle-type turret lathe is double-box ribbed construction and is equipped with hardened ways

The universal carriage is equipped with a heavy-duty slide for mounting of tools on the front and back. It has a spool stop for all longitudinal movements and a spool stop for the cross feed, which will disengage the feed in either direction. Apron is equipped with a sliding gear transmission of nine variable feeds, ranging from 0.005 to 0.100-inch on the longitudinal travel and from 0.0025 to 0.050-inch on the cross travel.

Saddle is fitted with wide long bearing surfaces on the ways and a large diameter bearing for the turret. It is equipped with a 6-station hollow hexagon turret that is located with a large taper locking pin and held in position with an automatic clamp ring. The saddle is furnished with a power traverse arranged to provide for two speeds in both directions. The higher speed is used for long travels such as to and from the work, and the low speed is employed for short approach to the work and power indexing the turret. Speed is reduced automatically on the return stroke as soon as it reaches the indexing position.

◆

IN THIS large new, high-speed Cincinnati Bickford radial drilling machine no forward or reverse spindle driving clutches are required, the need for them being eliminated by the use of a reversing motor

◆

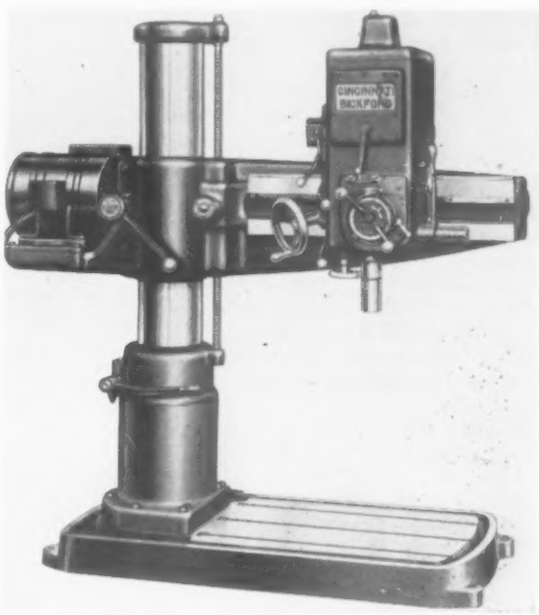
All the movements of the power traverse are controlled with a lever located in the center of the star wheel, and when the power traverse is engaged the star wheel is disengaged automatically. Six automatic stops are arranged, one for each position of the turret and three additional manually-operated auxiliary stops can be selected for any one position of the turret.

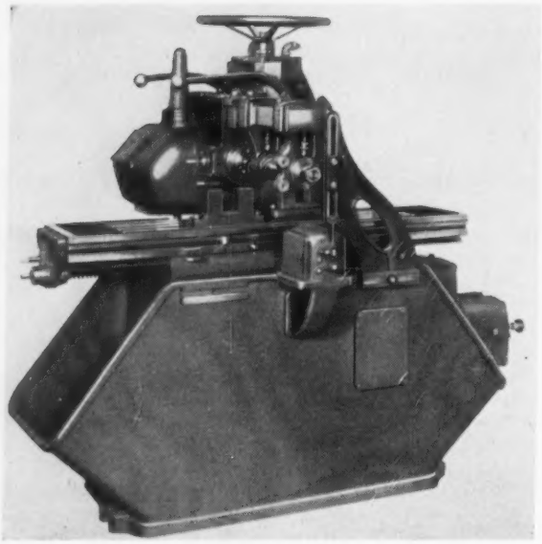
◆ ◆ ◆

Radial Drilling Machine—

Cincinnati Bickford Tool Co., Cincinnati, has developed a 3-foot, high-speed, all-geared, Super Service radial drill with column 9 inches in diameter. This machine is shown in the accompanying illustration. Spindle speeds may be as high as 3500 revolutions per minute without the use of belts, all speed changes being made at the head through sliding gears. All nine spindle speeds are controlled by a single lever. The customer is given the option of any one of five speed ranges. Option of two feed ranges is offered, also through sliding gears in the head controlled by a single lever.

Antifriction bearings are used throughout. Shafts are of the multiple integral key type; no inserted or single keys are used. Lubrication





SUNDSTRAND No. 2 automatic Electromil is designed for high-speed milling and gives low cost production of parts manufactured in small quantities

is automatic. The head is fully enclosed and the arm has a solid rear wall completely enclosing the arm shaft. The arm may be provided with power elevation conveniently controlled by a single fool-proof lever which also clamps and unclamps the arm to the column. Automatic safety stops are provided.

Easy, rapid handling is obtained from balanced arm and head. The head is on antifriction bearings rolling on a hardened steel arm-way and is moved at the rate of 3 inches per turn of handwheel. Feed engagement is of the positive type which will not slip or wear but which engages at any position with only a fraction of the effort required for friction clutches. Automatic disengagement of the power feed is governed by setting the graduated dial depth gage. Power feed is automatically disengaged at top and bottom limits of spindle travel.

For accuracy and rigidity, the spindle sleeve bearing at bottom of head is exceptionally long. The feed rack is an integral part of the spindle sleeve. Spindle and sleeve are counterweighted for fast, easy operation.

A distinctive feature is that no forward or reverse spindle driving clutches are required. This costly mechanism requiring frequent adjustment is eliminated by the use of a reversing motor. The lever at lower left of the head operates built-in push buttons and thus controls the forward and reverse rotation and stopping of the spindle.

• • •

Small Milling Machine—

Sundstrand Machine Tool Co., Rockford, Ill., announces a small Rigidmil known as No. 2 automatic Electromil, for high speed milling on parts of business machines, household appliances, electrical apparatus, firearms, small machines, tools and similar products. This machine, shown in the accompanying illustration, has automatic table control and is designed for use with extremely simple fixtures. It can be set up quickly and quickly changed from one job to another. So readily is this accomplished that it can be used effectively to secure low cost production on parts manufactured in small quantities; it approaches the economy of special machines in this respect.

Prominent among the many features and advantages of this new tool is its nimbleness of table movement. The table control employs light-weight, durable, electrical contacts instead of heavier, slow-moving parts which are subject to wear. While the movement is practically instantaneous in operation it is smooth and shockless. Any combination of table cycles within the capacity of the machine can be obtained quickly. Any one of three ranges of table feed is available. Spindle head is available in three types, low, medium and high-speed. Rotation of spindle can be continuous in one direction, can have automatic stop or automatic reverse.

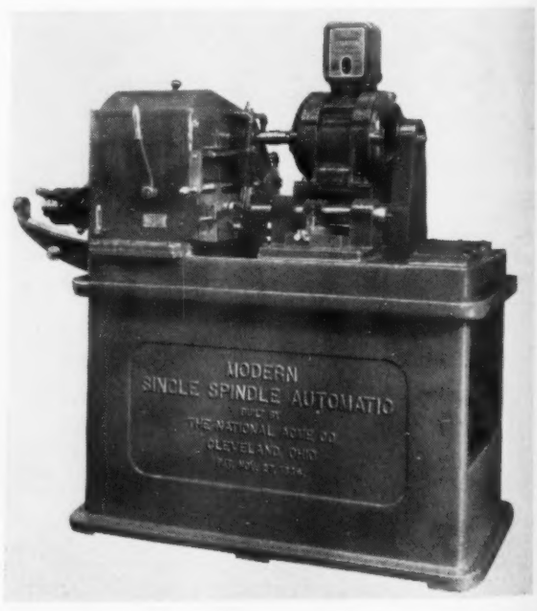
• • •

Automatic Screw Machine—

National Acme Co., Cleveland, announces a single-spindle automatic screw machine designed for economical production of simple pieces requiring only forming, drilling and cutting off. It is designed to meet the need in a wide field, says the company, for a simple, inexpensive machine, easily tooled up, sufficiently rugged for pushing cutting tools to the highest practicable speeds and feeds and which may be entrusted to an operator of moderate skill.

Mounted on a heavy base, the working parts of the machine are waist-high and the operator from one position can oversee all details. For larger quantities several machines can be efficiently handled by one operator. To reduce time for restocking, provision is made for handling bar stock in 20-foot lengths. This is fed into the spindle by tension continuously exerted on it by a spring operated drum mounted in the base of the machine. The bar is placed in a slotted stock tube and a follower attached to the outer end of a steel cable slips into the tube and the other end is wound around the drum. This method of feed entirely eliminates the necessity for the usual pusher and pusher tube, feeding cam and roller, etc., which not only simplifies the machine and reduces set-up time but eliminates the need of maintaining a stock of pushers of various sizes.

The chucking mechanism is oper-



SINGLE - SPINDLE automatic screw machine designed by National Acme for simple forming, drilling and cutting off operations

ated by a cam drum on the headstock, operating through the usual chucking spool and collet, and a hand lever is provided to permit hand chucking, when required, from the operating position. Stock is fed out against the drill in most cases. When drilling is not required, as in cutting off pins, a stock stop is mounted on the drilling spindle. An independently cammed disappearing stock stop may be furnished as optional equipment. The drill spindle may be stationary or rotating. As shown in the acompanying illustration the machine is arranged for rotating drill spindle.

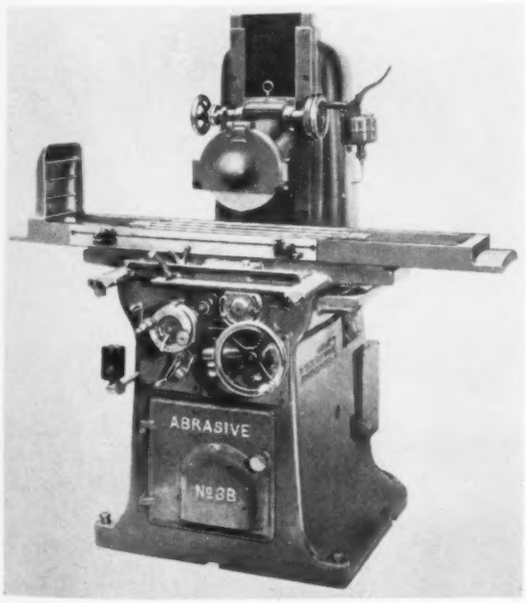
All parts of the machine are readily accessible. Changes in set-up can be made quickly. There is practically no idle time. All wearing parts of the machine run in oil. The husky proportions of the frame afford ample support to the cutting tools, insuring long life.

• • •

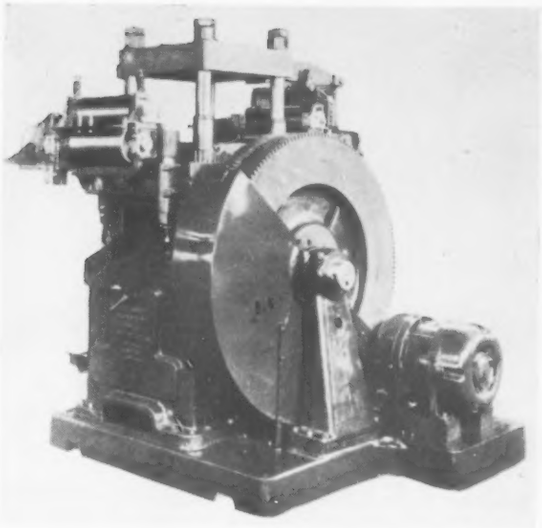
Surface Grinder—

Abrasive Machine Tool Co., East Providence, R. I., announces a new surface grinder known as 3B and shown in the accompanying illustration. It has one-piece bed casting, deep and stiff saddle, a two-speed transmission case giving table speeds of 20 and 40 feet per minute and an endless woven belt for the spindle drive. The machine has a very heavy spindle mounted in a phosphor bronze box at the front, and super-precision ball bearings at the rear, the whole assembly being in a removable cartridge type sleeve. In the transmission is a built-in oil shock absorber to eliminate the shock of table reversal.

The machine is precise and vibrationless and is adaptible to the most accurate work. The machine has work surface 24 x 8 inches. It has 26-inch total longitudinal, 8½-inch total transverse and 13-inch total vertical movements. The normal spindle speed is 2900 revolutions per minute. Standard wheel is 10 inches in diameter, ¾-inch thick and with 3-inch hole; larger diameters can be furnished on special order.



NEW 3B Abrasive grinder is precise and vibrationless and is adaptable to the most accurate work



HENRY & WRIGHT dieing machine produces at a single stroke intricate stamped metal parts, combining operations usually requiring a number of presses

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Dieing Machine—

Henry & Wright Mfg. Co., Hartford, Conn., announces a new 50-ton dieing machine shown in the accompanying illustration. It is an automatic, high-speed, power press with automatic, double-roll feed arranged with direct-connected motor drive and provided with heavy-duty, adjustable scrap cutter. It embodies many improvements. It produces intricate stamped metal parts complete at each stroke with the machine operating at high speed, thus combining in a single machine operations normally requiring a number of presses of conventional type.

The new machine employs a novel guiding principle. The angular thrust of the crankshaft is taken upon a crosshead or ram guided in lower base of machine, this crosshead actuating an upper crosshead or punch carrying member by means of four steel rods guided at die bed by adjustable taper bushings. Thus the punch carrying member is pulled downward with true vertical position instead of being pushed downward. The machine is equipped with a precision double-roll feed which operates with extreme accuracy.

The combination of the unique design, with precision machining and fitting, makes this machine capable of producing close limit stamped metal parts at high speed and with exceptionally long die life. The machine shown has roll feeds which handle material up to 12 inches in width, the maximum feed pitch being 8⅝ inches. The scrap cutter, of new design, automatically cuts material into lengths equal to the feed pitch.

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Contactor for Built-In Applications—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has developed a new line of 15 and 25-ampere contactors utilizing the De-ion principle of arc interruption. These devices, ideal for machine tool applications, are compact and permit efficient utilization of machine space. Confinement of the arc within the De-ionizing chamber permits this compactness. Double-break silver contacts are used.

Operation of the contactor depends on the principle that a thin layer of air immediately adjacent to cold cathodes will withstand about 250 volts before breaking down, and after having been subjected to an arc,

Here it is!

at the MACHINE TOOL SHOW

CLEVELAND — BOOTH A-205

PATENT APPLIED FOR

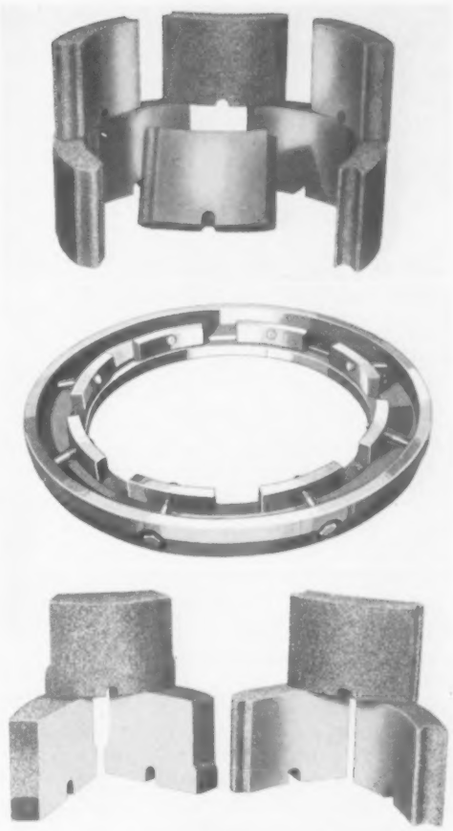
STERLING ABRASIVES

THE NEW STERLING
Segmental Wheel and Chuck

IN this new STERLING chuck and segmental wheel we have combined the experience and knowledge gained in years of making chucks for STERLING segmental grinding wheels. The STERLING chuck has always been of light weight and easy on the bearings of your grinders and we now offer a chuck still lighter than our standard chuck and with several added features for efficiency and economy.

With the new chuck each segment is mounted separately, the grooved segment fitting itself into its proper position and with a twist of the socket wrench each segment is tightened and remains solid throughout its life. A full set of segments can be set up in but a few moments and is so simple a child can do it. After wearing down the segments they can be set out and still more life obtained leaving but a fraction of an inch to be discarded.

This is a real production unit, built for production surface grinding with solid or gap type segments or solid ring wheels without the fuss and time consumed in sulphuring. Let our Engineers show you what a Sterling chuck and segmental wheel can do to reduce your grinding costs.

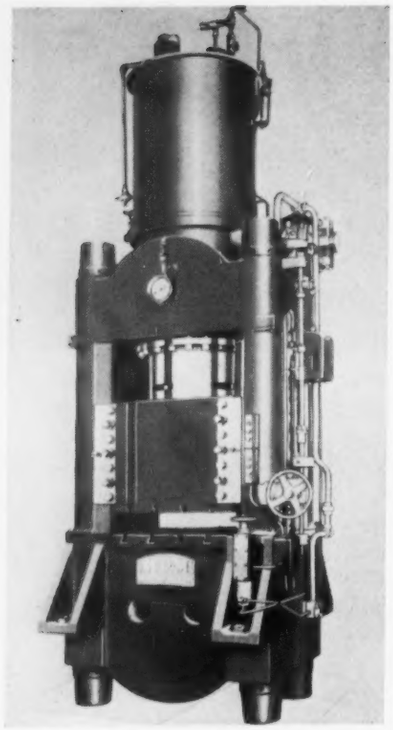


PATENT APPLIED FOR

Designed for
PRATT & WHITNEY
BLANCHARD · DIAMOND
OSTERHOLM
CAPITAL KNIFE GRINDERS

THE STERLING GRINDING WHEEL COMPANY
Abrasive Division of The Cleveland Quarries Co
Factory and Office: TIFFIN, OHIO CHICAGO: 133 N. Wacker Drive DETROIT: 101-107 W. Warren Ave.

STERLING ABRASIVES



H-P-M Hydro-Power Fastraverse press of the closed-upright type with shrunk tie rods and gib guides

de-ionizes rapidly and acquires the ability to withstand this voltage again very quickly.

♦ ♦ ♦

Hydraulic Presses—

Hydraulic Press Mfg. Co., Mount Gilead, O., announces an improved line of H-P-M Hydro-Power Fastraverse presses for production service. New models continue basic principles of previous models and introduce new features which contribute to efficiency, safety and economy. The presses are compactly self-contained with direct electric motor drive; they are fast yet smooth in action by virtue of the closed-circuit system of operation. All functions are synchronized and automatic.

Automatic operation is accomplished by patented hydro-electric control. This involves pushbutton start, automatic pressure reversal, instantaneous emergency reversal, and other features. When set for semi-automatic operation, the press ram stops at the initial position at the end of each cycle. With full automatic, the same cycle is repeated, restarting each time automatically. Change from one mode of operation to another may be effected.

Every pressure circuit is made up of seamless steel tubing; each line is a continuous length, bent to shape and fitted at its terminals with welded-on steel flanges, or forged compression fittings.

To meet all press requirements, two types of press frames are included in the line. These are the open-rod type and the closed upright, shrunk-rod type. With the open-rod press, the uprights serve both as tension members and as guide rods for the moving platen. The closed upright press has tapered gib guides which are adjustable front and back to maintain accurate central alignment of the ram and platen.

Each type of press is available in a wide range of standard sizes, varying in 12-inch increments of bed areas and pressure capacities as follows: 100, 150, 200, 250, 300, 400, 500, 600, 750, 1000, 1500, 2000, 3000, 4000 and 5000 tons.

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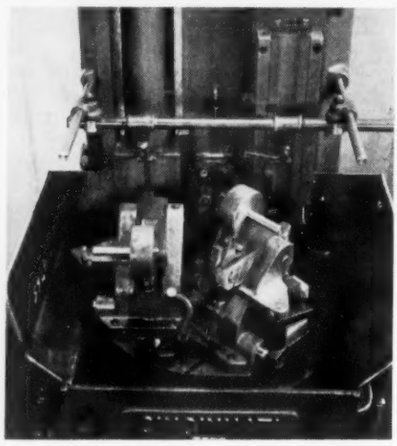
Broaching Set-Ups—

Cincinnati Milling Machine Co., Cincinnati, has developed set-ups for performing special production jobs



Set-up employed on duplex vertical Cincinnati Hydro-Broach for broaching both sides of spring perch boss on automobile front radius rod support

on its hydraulically operated, duplex, vertical, broaching machine known as the Hydro-Broach, described in STEEL of Sept. 3, 1934, page 42. One of these is shown in the accompanying illustration of the set-up for broaching both sides of the spring perch boss on automobile front radius rod supports.

This operation, performed on a machine of 2-ton capacity with 36-inch stroke, involves stock removal of 3/32-inch on each side of a steel forging at a rate of 550 pieces per hour. The entire machine cycle is automatic and may be stopped or started at any point by convenient hand levers or floor treadle. The operator loads and unloads work in one fixture while the work is being broached in the other fixture. Speed of the broaching cutters is 34 feet per minute.

Two special work holding fixtures, one for the left-hand part and one for the right-hand part, are mounted on the indexing table of the machine. The work is located from the previously broached inside bosses, in a V-block under the rough, barrel-shaped spring perch boss and from a fixed point on the side of the radius rod support. A cam actuated, weighted lever, hand operated, clamping mechanism operates one clamp over the top of the barrel-shaped perch boss close to the cut and a second clamp at the end of the radius rod support. The entire clamping arrangement was ingeniously worked out, the reaction of the primary clamp operating the secondary clamp.

A special set-up also has been worked out for broaching the inside faces on the same front radius rod supports. This operation is performed on a machine with capacity of 5 tons and having a 42-inch stroke. Average production per hour is 515 pieces, using a broaching speed of approximately 31 feet per minute.

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Die Casting Machine—

Madison-Kipp Corp., Madison, Wis., announces its new No. 6 die casting machine shown in the accompanying illustration. It is inter-

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MADISON-KIPP No. 6 die casting machine is designed for high production with zinc, aluminum, lead and tin alloys

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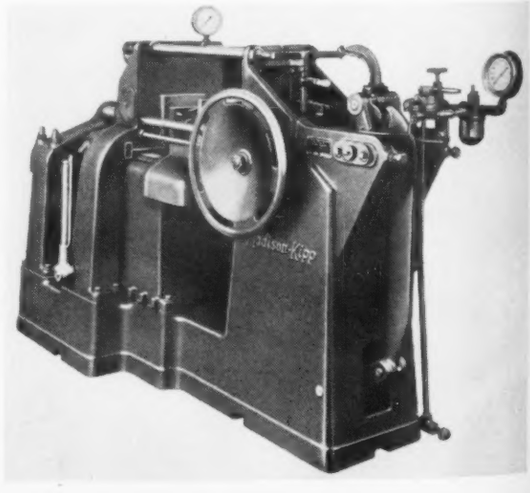

mediate in size and will handle all standard die casting alloys in zinc, aluminum, lead or tin. Standard equipment includes an air pressure gooseneck but a plunger type gooseneck may be supplied. Effective capacity of the standard air gooseneck is 5 pounds in zinc alloy but oversize goosenecks may be applied.

Metal pot capacity is 300 pounds in zinc alloy. To the features which characterize all machines made by this company have been added other features such as the Geneva mechanism for quickly moving the complete furnace assembly and for changing pots and goosenecks when a change in metal specifications is necessary.

Speed at which the machine can be operated is determined almost entirely by the rate of solidification that can be maintained in any given die. Rapid solidification is accomplished by means of water cooling channels in the dies. The metal pressure gooseneck automatically is loaded with metal from the metal pot with each stroke of the machine. The company's patented core pulling mechanism may be applied to this machine so that all cores are placed and withdrawn as the dies open and close. Ejection of castings is automatic with opening of dies.

Safety features prevent metal from being shot into the die until the die halves are closed and locked. A handwheel is provided for die setting and for auxiliary hand operation whenever this becomes necessary; otherwise the entire machine is operated by power. A notable design feature is that the main support column of this machine is integral with base.

♦ ♦ ♦

Bar Turner for Turret Lathes

Warner & Swasey Co., Cleveland, has developed a new line of heavy-duty bar turners for turret lathes. These tools, shown in the accompanying illustration, have been designed for the heaviest work and the coarsest feed using stellite and tungsten carbide cutting tools. In each case the body of the turner is as narrow as possible, the width being made up of the rear roller diameter, the maximum work diameter, the thickness of the cutting tool and the setscrew length. Illustrated is another important feature, the position of the tool rolls; these are so placed as to make efficient steady rests for heavy work done from the cross slide of the turret lathe. The entire tool is designed to require no lubrication other than the coolant employed.

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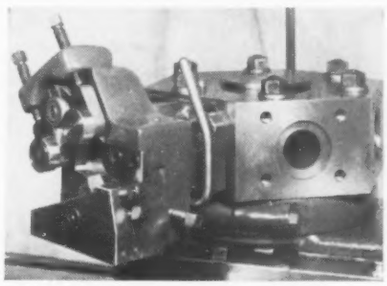
Honing Machine—

Carborundum Co., Hutto Division, Detroit, announces a vertical, single-spindle, single-base, crank-reciprocated, honing machine known as V-300 series and shown in the accompanying illustration. It is complete with variable speed, mechanical, rotation drive, hydraulically controlled, and variable, hydro-mechanical, reciprocation drive for providing a harmonic reciprocation motion, thereby asuring straight as well as round bores. It is equipped with an adjustable, hydraulically actuated, mechanical lift-out for withdrawing hone from and inserting it into bore.

Rotary and reciprocatory movements are independently adjustable and so powered and arranged as to afford infinite flexibility in speeds of both movements. This makes the machine instantly adaptable to any diameter and length of bore coming within its capacity. When desired, adjustments may be provided to permit dwell in the stroke at either or both extremities, a particularly advantageous feature in the honing of blind-end bores of the aircraft type.



Bar turner for Warner & Swasey ram-type turret lathes is designed for heaviest work and coarsest feed obtainable with modern cutting materials

Vertical, single-spindle, crank-reciprocating, Hutto machine hones bores straight as well as round and may be adjusted to permit dwell in the stroke

♦ ♦ ♦

Precision Thread Grinder—

Ex-Cell-O Aircraft & Tool Corp., Detroit, is offering a precision thread grinder, shown herewith, that is of modern design, compact and rigid in construction. This self-contained, motor-driven machine is designed for wet grinding either right or left-hand threads on screws, taps, chasers and worms. Eccentrically relieved taps or chasers, whether right or left-hand continuous threads and multiple threads also can be ground on this machine by the use of suitable indexing fixtures.

Capacity of the unit permits a maximum diameter of 5 by 18 inches long work to be held between centers. Threads up to 5 inches diameter by 8 inches long can be ground. The grinding wheel is 18 inches in diameter with 9-inch diameter hole and is 5/16-inch in thickness. A stepped pulley is provided for obtaining higher wheel speed after the wheel diameter is worn down. The wheel spindle is mounted on a swivel and graduations in half degrees are provided so that it may be swung in a vertical

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A WORK-POSITIONING and backlash device is employed on this Ex-Cell-O precision thread grinder, permitting proper positioning of the thread groove in the work in relation with the grinding wheel when the work has been threaded previously

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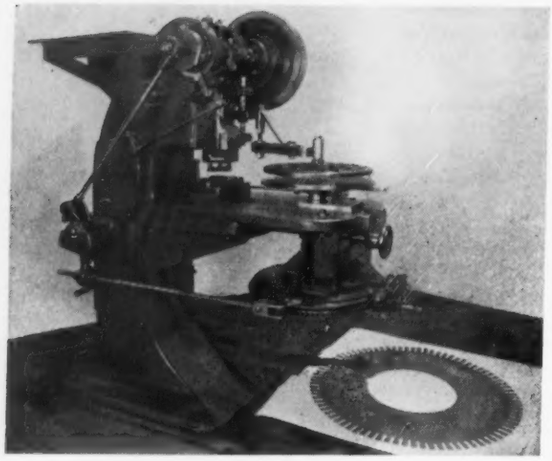

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V & O notching press notches at high speeds and accuracy within a lamination range of 3 to 20 inches in diameter and with maximum of 120 notches

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plane to a maximum of 15 degrees in either direction to suit the helix angle of right or left-hand threads.

Threads can be ground on hardened or heat treated work, from the solid blank, holding a tolerance on the lead not to exceed 0.0002-inch error per inch length, or an accumulative error not in excess of 0.0006-inch on longer work. It is claimed that pitch diameters on work up to 1-inch diameter will not vary more than 0.0002-inch while on larger work it can be held to an additional tolerance of 0.0002-inch for each additional inch of diameter.

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Cam Grinding Machine—

Norton Co., Worcester, Mass., announces its new Cam-O-Matic for automatically and successively grinding each cam on a camshaft, truing the grinding wheel, then stopping ready to be reloaded. The operator loads, presses a pushbutton and moves one lever, thus starting the automatic cycle. This causes the rocking bar to lower, bringing the master cam in contact with the master cam roller, starts the work rotating and feeds the grinding wheel in rapidly until it contacts the work when it slows down to a grinding feed. A timing unit causes each cam to make exactly the same number of revolutions in contact with the grinding wheel and the latter to leave the work upon completion of grinding at the nose of the cam. A new work drive unit provides a speed range of 12 to 75 revolutions per minute, covering requirements of both roughing and finishing.

The machine is electrically controlled and hydraulically operated. Upon completing the predetermined number of revolutions in contact with the grinding wheel, a limit switch energizes a solenoid that operates the wheel slide control valve, causing the grinding wheel to recede rapidly and operating other valves which lift the rocking bar and cause the table to move quickly to the next cam. In sizing the grinding wheel always feeds in to a positive stop, thus assuring duplication of performance. A feature is the reciprocation of the wheel during grinding; this reciprocation stops automatically while the wheel is being trued.

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Notching Press—

V & O Press Co., Hudson, N. Y., announces a new notching press known as No. 410, which operates at higher speeds and notches more accurately than any such press previously built by this company. Shown in the accompanying illustration, the machine is of the pedestal-type with overhanging journal bearings which carry the thrust directly into the body proper. The shaft has an eccentric throw, affording rigidity and a large bearing surface.

Shocks from engagement at high speeds are eliminated by using a multiple-disk friction clutch of a type which eliminates backlash. The fully releasable brake is engaged only when the clutch is released. The flywheel is machined to perfect balance. A double-length slide runs in ways of equal length which are cut in the solid body casting and adjustment is by a single loose gib and one set of adjusting screws. These features effect precision of slide travel and accuracy of punch and die registration. Other features effect accurate spacing and long life of the wearing parts.

The range of laminations that can be notched is from 3 to 20 inches in diameter, with a maximum of 120 notches. It is designed to operate at speeds up to 650 strokes per minute. It is designed for either a rotor or a stator fixture.

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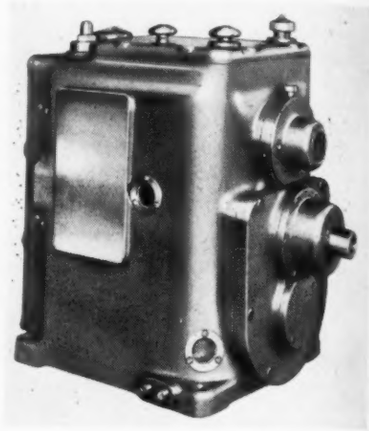
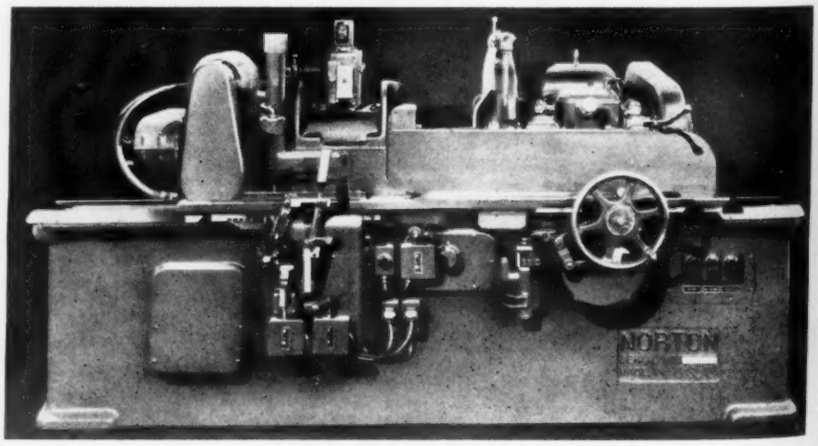
Hydraulic Units—

W. F. & John Barnes Co., Rockford, Ill., announces four new hydraulic feed units adapted to heavy boring and drilling. Advantages



Barnes FT type hydraulic unit used principally for operation of boring and drilling heads

claimed for these units are: Rapid approach of tools to work at a fixed rate; easy adjustment to any desired feed rate between zero and maximum for the cycle; accurately controlled dwell; rapid return of tools



New Cam-O-Matic automatically and successively grinds each cam on a camshaft, trues the grinding wheel and stops ready to be reloaded

to starting position; and automatic stop or repeat.

Constant ratio between feed rate and revolutions per minute of cutting tool is maintained under all conditions. Correctly ground tools cannot chatter. Oil in the circuit has prolonged life and its temperature remains low. These features are obtained through two pumps and one control valve. A minimum of piping, joints or passages are used.

The company's flange-type unit may be adapted for manifolding direct to cylinder or may be piped direct to valve and cylinder with a minimum of piping. The indexing-type unit is a complete mechanism for hydraulically indexing a fixture in relation to boring spindles. The FT type unit, shown in the accompanying illustration, is used principally for operation of boring and drilling heads and usually is mounted on a bracket at rear of the machine and controlled by necessary valve.

A 3-horsepower square ram unit is designed for a class of work which does not require the heavy-duty hydraulic heads and to meet demand for a drill unit which can be incorporated in existing machines or new designs. This unit can be operated in any desired position or at any angle and in combination with independent or centralized control. A 5-horsepower unit of the same type also is manufactured.

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Surface Grinder—

Blanchard Machine Co., Cambridge, Mass., announces a new surface grinding machine known as No. 18 and shown in the accompanying illustration. Improvements and new features make it faster, more accurate and easier to operate. It carries an 18 x 5 x 15-inch grinding wheel and a magnetic chuck which may be 26, 30 or 36 inches diameter. An oversize 20-inch wheel can be used and work height increased.

Chief among the new features are: Power traverse for chuck; water guards of new type opening at the front, increasing safety and confining splash and spray; lower position of chuck face for easier handling of work; increased rigidity of spindle and main members of machine; individual motor drives for table traverse, raising and lowering head, rotating chuck and operating water pump; feeds from 0.004 to 0.08-inch per minute; accurate feed stop for any distance less than 0.1-inch; quick spindle stop.

The one-piece steel magnetic chuck is driven through a sliding gear box with six speeds from 6 to 33 revolutions per minute from a direct-connected motor started and stopped by pushbutton control, eliminating the clutch. The feed handwheel which makes one turn for 0.025-inch feed has a dial which makes one turn for 0.1-inch feed. This dial carries the feed trip and automatically at any amount of down feed less than 0.1-inch. The lever which engages the feed also controls the rapid raising and lowering of the head and the two motions are interlocked. Chuck speed and feed gear boxes have oil supplied to all bearings from a gear pump through a filter.

Power traverse of the table is driven by motor on back of base and is automatically stopped at each end of the travel. The inner table stop is easily adjustable, to stop the table at any desired point for grinding work that has a hub. All controls are grouped and all motor starters and protective relays are in one cabinet. The base has three-point bearing on the floor. The machine has capacity for 125 gallons of water.

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No. 18 Blanchard surface grinder has numerous new features which make it faster, more accurate and easier to operate

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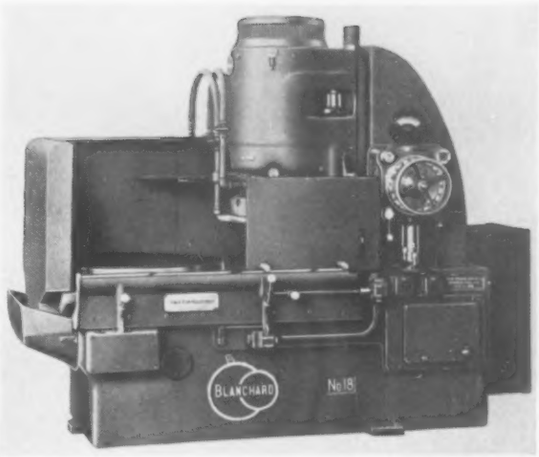

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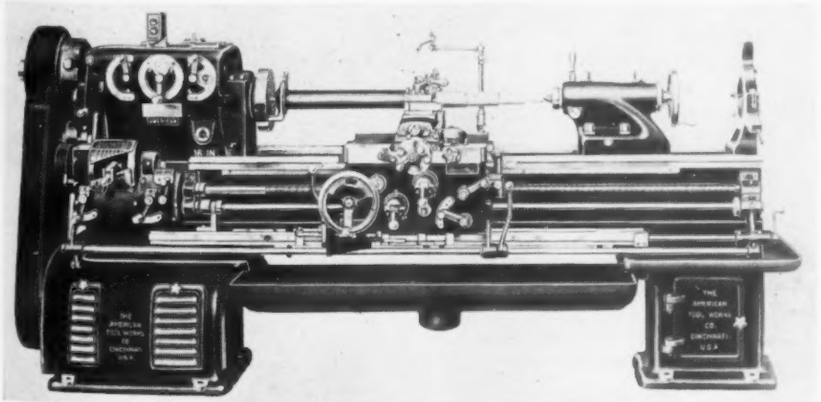
Multi-Production Lathe—

American Tool Works Co., Cincinnati, announces the American Multi-Production lathe developed to fill the gap between the standard engine lathe and the highly specialized single-purpose automatic lathe. It combines adaptability and range of the standard engine lathe with the productive characteristics of single purpose turning equipment. To match the improvement in new high-speed cutting alloys and in anticipation of their increasing use, the new lathe, shown in 16-inch size in the accompanying illustration, is provided with high power, inherent stamina and high speeds.

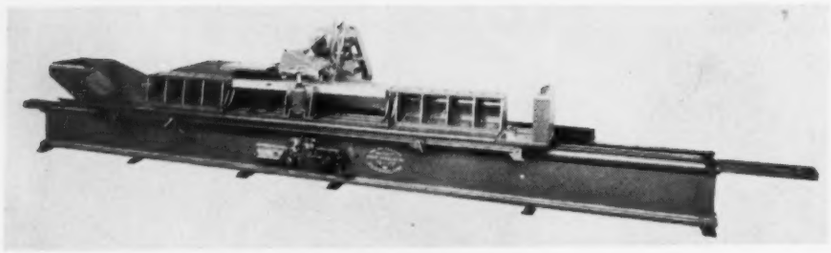
To provide for stopping carriage feed automatically at predetermined points along the work a highly accurate and positive, quick-setting, automatic longitudinal stop mechanism is supplied. For quickly and accurately locating the stop dogs which actuate this mechanism, a large rust-proof scale is slidably mounted in the front face of the outer bed way. This scale reduces stop setting time and is always ready for use.

Hand-operated positive diameter stops of barrel-type are an important item of the lathe's equipment. This mechanism provides for five work diameters and carries adjustable stop dogs for both front and rear cutting tools. So accurate and positive is this device that calipering of work is eliminated.

To facilitate setting cross feed stops and to determine work diameters accurately and quickly when the



Adaptability and range of the standard engine lathe and the single-purpose automatic lathe are combined in this 16-inch American Multi-Production lathe



Bridgeport face and shear grinder is designed for accurate grinding of flat surfaces in general. As shown, it is equipped for grinding shear blades

cross stops are not in use, patented, dual-drive, direct-reading cross feed dials are provided which are geared to the cross feed screw so as to read directly in terms of work diameters. One dial is graduated in fractions, the other in thousandths, and read directly on the work.

High work velocities permitted by use of cemented carbide cutting tools makes a live tailstock center essential. For this service, a substantial roller bearing mounted center is built into the tailstock spindle, forming a highly stabilized unit capable of withstanding the most severe stresses. To protect the operator against flying chips when turning at high speeds, a patented chip breaker and controller is affixed to the cutting tool which breaks the chips into small sections and directs them into the chip pan and away from the operator.

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Shapers—

Cincinnati Shaper Co., Cincinnati, announces two new shapers. The first, shown in the accompanying illustration, is a 16-inch, high-speed machine with new cutting speeds up to 200 strokes per minute. The second is a 24-inch machine designed for extremely heavy cutting. Both have the well-known Cincinnati, built-in power rapid traverse, multiple cams and automatic oiling. New features are the new speeds, larger frame members for greater capacity, special high speed, automatic, tool head for using tungsten carbide tools on a reciprocating stroke and new finish to levers and dials for easier vision.

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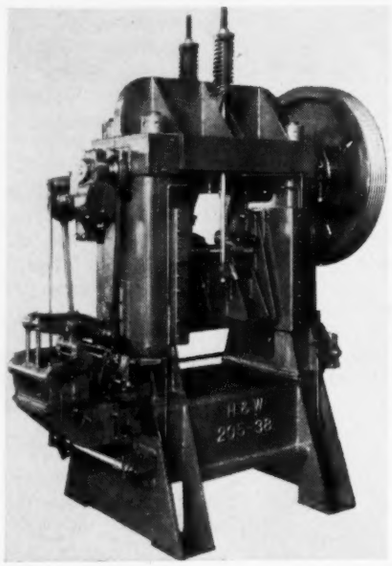
Shear Blade Grinder—

Bridgeport Safety Emery Wheel Co., Bridgeport, Conn., announces its new type 75, heavy-duty face and shear blade grinder. It is adapted to the accurate grinding of flat surfaces in general, either by holding the work to the table itself, in a special fixture, or on magnetic chucks. As shown in the accompanying illustration, the grinder is equipped for grinding shear blades. The center section is a double face, center controlled magnetic chuck for holding flying shears and other knives with bevel edges. For grinding long squaring shears the revolving bar is lined



New Henry & Wright, automatic double-crank, steel press makes possible high-speed production of intricate stampings from progressive dies

up with the angle bar sections on ends of table.

The work table operates on vee and flat ways equipped with force-feed lubrication system manufactured under patents of the G. A. Gray Co., Cincinnati, providing efficient lubrication from an oil reservoir in the bed by means of a double-acting type oil pump not only to the ways but to the bearings in the bed of the machine. A Purolator cleanses the oil on its return to the reservoir. Rails are protected against falling materials and spray or grit from the grinding wheel by guard strips.

Oilgear hydraulic pump and motor provide a dependable means of driving the carriage at any desired speed up to 90 feet per minute. Spindle is of large diameter, equipped with Timken bearings and a circulating lubricating system. The Bridgeport sectional wheel mounted in a steel chuck is used. Construction of the chuck and shape of the sectional wheel blocks is such that a maximum of service is obtained from the grinding wheel. A dresser mounted on the wheel guard permits easy dressing of the wheel.

Movement of the wheel to the work also is controlled by the hydraulic unit. Centrifugal pump provides adequate coolant to the wheel and work. A hose is also attached to the supply line for cleansing the face of the chuck. Designed for heavy-duty service, the machine will produce accurate work in minimum time and at low operating cost.

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Press—

Henry & Wright Mfg. Co., Hartford, Conn., announces its 204½-38, automatic-feed, high-speed steel press, embodying numerous new features. Shown in the accompanying illustration, it is of the double crank, straight sided, tie rod type. Frame members and slide are welded units normalized and annealed before machining to insure freedom from stresses. Uprights are hollow and internally braced. Crown, bed and

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THIS new 16-inch Cincinnati rapid-traverse shaper permits speeds up to 200 strokes per minute. New features in it also are incorporated in a new 24-inch shaper for extremely heavy cutting

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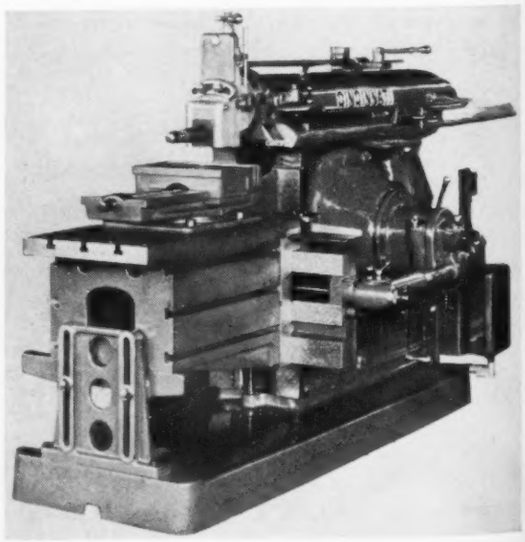

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PRECISION BEARINGS

BALL. ROLLER AND THRUST

Booth A-401, National Machine Tool Exposition.

NORMA-HOFFMANN BEARINGS CORP'N., STAMFORD, CONN. U.S.A.

LANDIS Type C semi-automatic hydraulic grinder is designed for grinding multi-diameter shafts. The illustration shows a machine tooled up for grinding 5-diameter camshafts

slide are of special design and amply proportioned, insuring a maximum of rigidity even in overloading.

The special design employed, the ample sections provided and the precision limits to which the press is built make possible production of intricate stampings from progressive dies at high speed. The press is equipped with automatic, double roll feed of improved type and also with an improved, automatic scrap cutter.

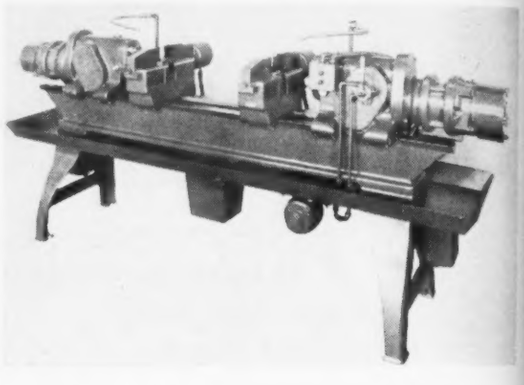
◆ ◆ ◆

Grinding Machine—

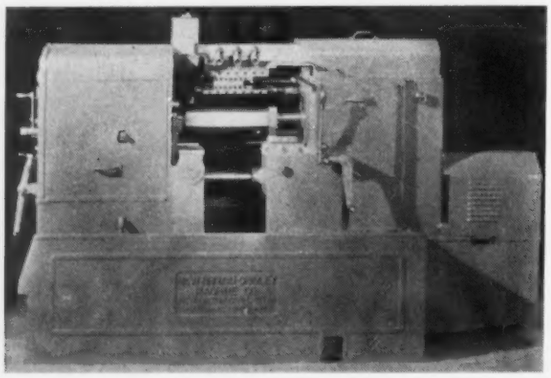
Landis Tool Co., Waynesboro, Pa., is introducing a new 10-inch type C hydraulic grinder designed particularly for grinding multi-diameter shafts. Because parts of this kind are ground more economically on machines arranged for semiautomatic operation, the new grinder is tooled in this manner. When such tooling is employed, greatly varying diameters of the same shaft may be ground on the same machine with only one set-up and no loss of time. The grinder shown in the accompanying illustration is tooled to grind all five main bearings of a well-known camshaft.

While the machine is grinding a shaft, the operator can easily load and unload a second machine. An ideal set-up is one in which the first machine is used for roughing, the second for finishing. The standard 10-inch Type C plain hydraulic bed is used. Headstock also is standard, although when grinding certain parts some special work driving means may be required. The footstock spindle is hydraulically operated. Basically, the wheel base is standard with wheel spindle drive through multiple V belts. A conventional plain feedup handwheel is provided to compensate for wheel wear. A standard reciprocating spindle mechanism is used.

On the machine illustrated, five bases are mounted on the table between the workheads. Only the center three are used for work rests. Parts having a different number of diameters than a 5-bearing camshaft would require a different number of bases with the number of workrests determined by length and characteristics of the parts. The Landis-Solex sizing device is used. Being automatic in operation and consistently accurate, it permits full productive possibilities of the machine to be utilized, while at the same time close limits are maintained.



STAR automatic drilling and centering machine is designed to perform centering work on a production basis and at low cost



A WIDE range of spindle speeds to utilize modern cutting steels and materials is embodied in this model 40 New Britain-Gridley multiple-spindle, automatic screw machine

One rather unusual new feature is arrangement in connection with the hydraulic infeed which compensates for the different points at which grinding begins when varying diameters are being ground. The wheel truing mechanism is of the hydraulically-operated type.

Weight of the grinder complete with all tooling and electrical equipment is 12,500 pounds. Three motors are used, all being of the constant-speed type.

◆ ◆ ◆

Automatic Screw Machine—

New Britain-Gridley Machine Co., New Britain, Conn., recently brought out a model 40 multiple-spindle, automatic screw machine that is a development of its model 41 in a smaller size. All the features of the latter such as preloaded ball bearing spindles, automatic spindle carrier, lifting and clamping and cylindrical cross slides have been incorporated in the model 40, shown herewith. Careful selection of material, use of alloy steel gears and shafts, antifriction bearings, etc., have been continued in this design. A wide range of spindle speeds to utilize modern cutting steels and materials is included. Model 40, also of the 4-spindle type, is built in two sizes, ⅜-inch and 1 by 5-inch capacity.

◆ ◆ ◆

Drilling and Centering Machine—

Seneca Falls Machine Co., Seneca Falls, N. Y., has developed an automatic drilling and centering machine known as the Star in response to demand for an efficient method of centering work on a production basis. Shown in the accompanying illustration, it provides high production on a continuous basis and still is sufficiently flexible to permit economical change-over when necessary. This has been accomplished by using two motor-driven independent heads each with its own closed cycle and independent speeds and feeds, arranged to operate in timed relation to each other. Each head is provided with

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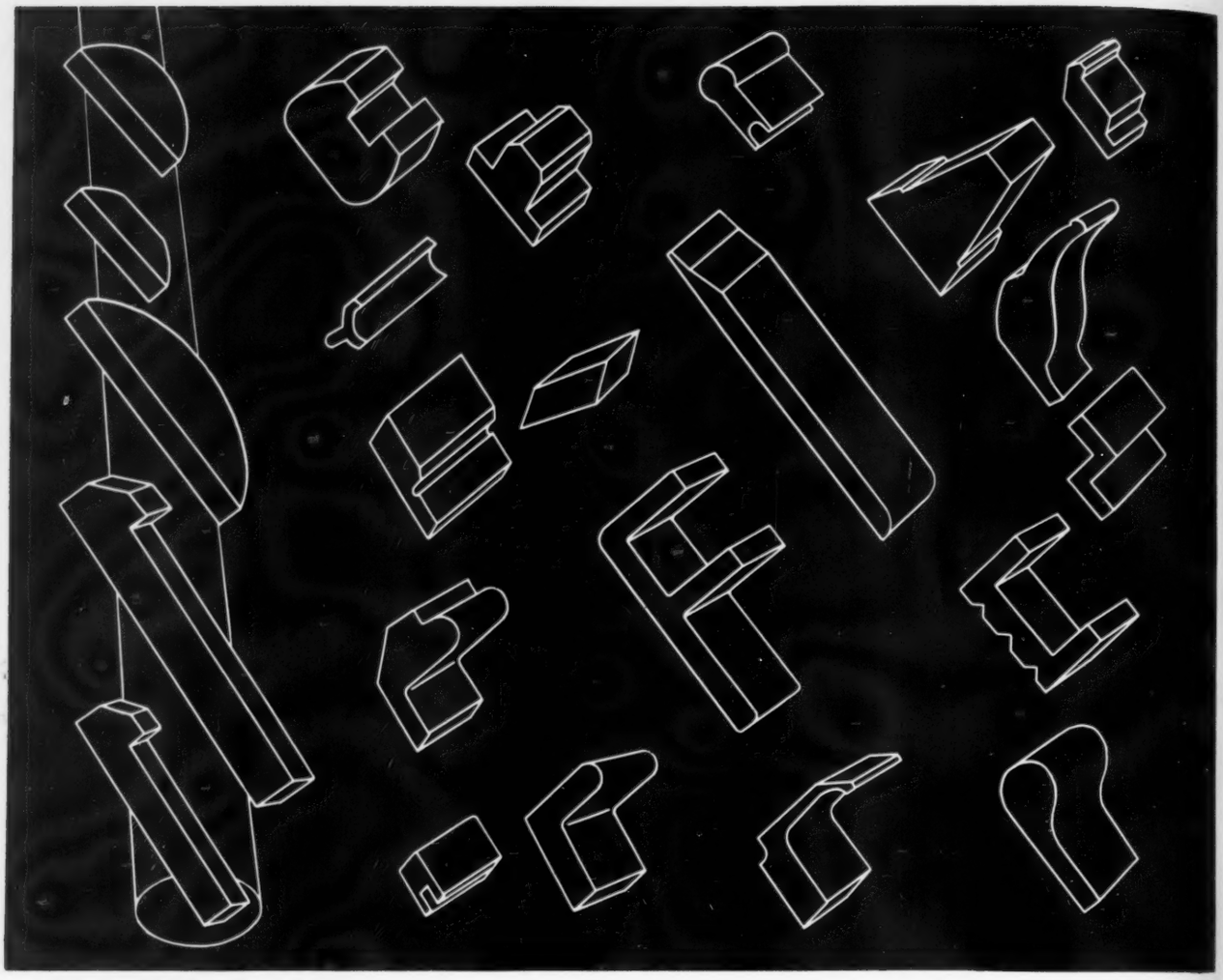

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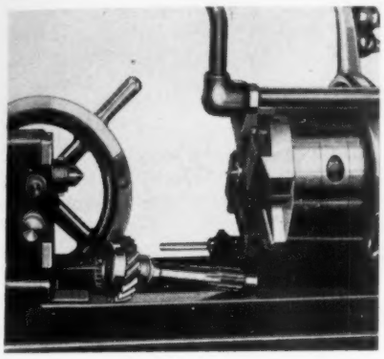
hardened steel barrel cam which imparts the feeding movement to the spindle and makes it possible to vary the feed stroke to suit individual operations. There is room for work fixtures when they are necessary. Standard, quick, acting, equalizing vises are available and may operate single or in parts. The standard cycle provides rapid approach, feed, withdrawal near end of feed stroke to clear chips and a slow final feed insuring a smooth, accurate center hole. Other variations in the cycle are possible so that one end of a shaft may be drilled, centered and counter-bored while the other end is being centered.

• • •

Turret Lathe—

Foster Machine Co., Elkhart, Ind., has developed a new No. 3, indexing, turret-type Fastermatic shown in the accompanying illustration. It combines high productive capacity with simplicity of operation, dependable accuracy, rugged construction and low operating and first costs. The bed has adjustable blocks for leveling. There are 16 changes of spin-



Attachment for Landmaco machines as arranged for holding automobile clutch gears for the threading operation

dle speeds arranged in four sets of four automatic changes.

Any group of four automatic changes may be selected by hand levers on the front of the machine. After the automatic range has been selected, the changes are made by the forward movement of the turret unit and, if desired, four automatic spindle speed changes may be made with one forward movement of the turret, and they may be made with each and every face of the turret.

The machine is equipped with a bridge-type cross slide, providing a front and rear slide either of which may be used in conjunction with any faces of the turret desired. The turret unit is equipped with a hexagon turret. The hydraulic feeding arrangement provides a separate and independent feed for each face of the turret and any proportion of the feeding movement can be converted automatically into rapid traverse movement. With the entire feeding mechanism operated hydraulically, fully 75 per cent less moving parts are required than on older machines equipped with gear or screw feeds, and at the same time a greater feeding range is available. The new machines are built in four sizes each of indexing turret and platen types.

• • •

Work-Holding Attachment for Threading—

Landis Machine Co., Waynesboro, Pa., has developed a work-holding attachment for use on its Landmaco threading machines. It facilitates handling of hitherto difficult threading problems. As shown in the accompanying illustration, it is arranged for holding automobile clutch gears for threading.

On this particular job it is necessary that the thread be concentric with the gear. To maintain concentricity the arrangement also includes a live center supported in the die head as illustrated. Thus, in effect, threading is done between centers. The gears are not rigidly clamped for the threading operation but are placed by hand over the mandrel. They are driven by lugs on the mandrel engaging with the internal gear. The mandrel has a hardened and ground locating surface which serves to promptly line up the gear for the threading operation.

The live center, which extends slightly beyond the face of the die head, is placed under spring pressure so that as the operator moves the carriage forward to bring the position of the gear to be threaded adjacent to the chasers, the center moves back into the bore of the head. The center operates in a hardened and ground bushing and has ample bearing surface to insure proper alignment.

The work holding and driving mandrel are applied to a standard

Modernized Ex-Cell-O cemented carbide tool grinder

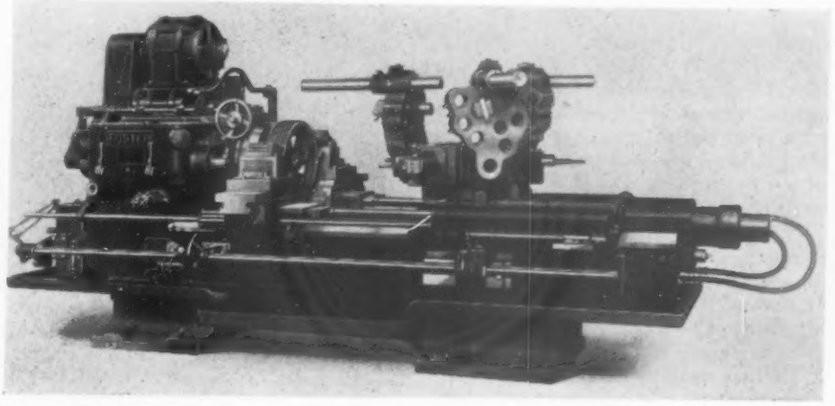
carriage front or vise on the Landmaco machine so that it can be applied very readily or removed if the machine is to be used for regular threading work. The live center in the die head and machine spindle also are removable. Modification of the attachment can be supplied for meeting similar operating conditions.

• • •

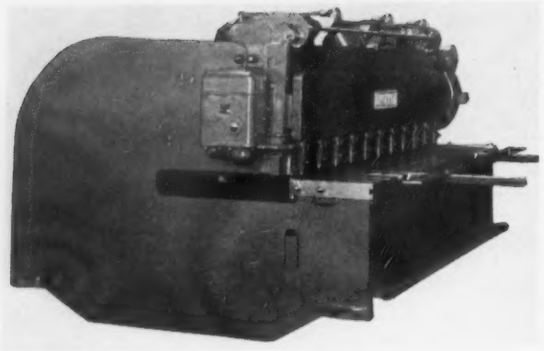
Carbide Tool Grinder—

Ex-Cell-O Aircraft & Tool Corp., Detroit, is presenting a newly designed cemented carbide tool grinder. An inbuilt ¾-horsepower motor is mounted in the main casting at the top of the machine and drives two diamond wheels. A reversing switch provides the correct rotation of the wheels for right or left-hand tools. At each end of the machine is located an adjustable tool support table to obtain the correct rake and angle on each tool to be sharpened. A horizontal slot is provided in the face of each table to top to guide a tool support across face of diamond wheel.

Coolant is essential when using dia-



Indexing, turret type Foster Fastermatic combines simplicity, ruggedness and accuracy with low operating and first costs



THIS new all-steel Cincinnati high-speed squaring and slitting shear has capacity for ⅜ x 96 inches and has new features which permits extreme accuracy in work

mond wheels for carbide grinding. A standard ¼-horsepower motor drives a centrifugal pump by means of a coupling. To make a compact installation the motor, pump and coolant tank are located in the base of the machine. A water guard shown in phantom in the accompanying illustration, provides the proper protection for the operator from the coolant while the machine is in operation. Two sliding doors at the front and also at the back give easy access to wheels and enable the operator to hold the tools during sharpening.

• • •

Shear—

Cincinnati Shaper Co., Cincinnati, has developed a new high-speed squaring and slitting shear shown in the accompanying illustration. It has capacity of 3/16 x 96 inches. To the company's exclusive features, hydraulic hold-downs, worm and worm wheel drive, high-speed and automatic oiling have been added the tilted upper knife bar for extreme accuracy, lower rake to the knife for shearing flat strips, graduated stainless steel scales to the table, automatic gaging front and rear and a light beam shearing gage for cutting to a scribed line.

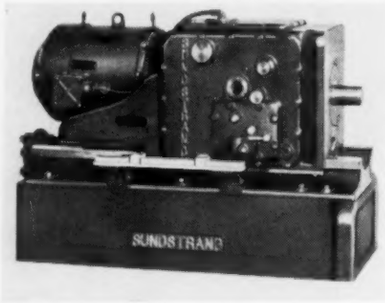
• • •

Hydraulic Sliding Head Drill Unit—

Sundstrand Machine Tool Co., Rockford, Ill., has developed a 5-horsepower, hydraulic, sliding-head drill unit which is suitable for boring, drilling, reaming, spot facing, milling and similar operations. This unit, shown in the accompanying illustration, has a base or slide on which is mounted a head with direct-connected motor drive.

Drive for rotating the spindle is mechanical through a specially designed floating coupling and a pair of pick-off gears, running in a bath of oil, on the side of the head. Spindle speeds can be changed readily by transposing the pick-off gears or substituting others having a different ratio. The entire range of spindle speeds can be altered readily if desired by changing gears at the front of the head.

The automatic operating cycle includes rapid approach to work, feed, a slower feed and dwell or dwell only, rapid return and stop. Both feed rates are adjustable throughout their entire range. Operation of feed and rapid traverse may include



Sundstrand hydraulic, sliding-head drill unit for boring, drilling, reaming, spot facing, milling and similar operations

rapid traverse between intermittent cuts. Hydraulic power for feeding is provided by a variable-displacement multi-piston pump and, for rapid traversing, by a constant displacement pump. The hydraulic circuit provides shockless, high-speed traverse, smooth, uniform feeds. It prevents tools jumping ahead at the completion of the cut, or during an intermittent cut. Every possibility of air collecting in the circuit is automatically eliminated.

In the 5-horsepower unit the head travels 14 inches and standard spindle speeds range from 170 to 900 revolutions per minute, with others available. Feed may range from ⅜-inch to 40 inches per minute. The rapid approach rate is 280 inches per minute and the rapid return rate 370 inches per minute.

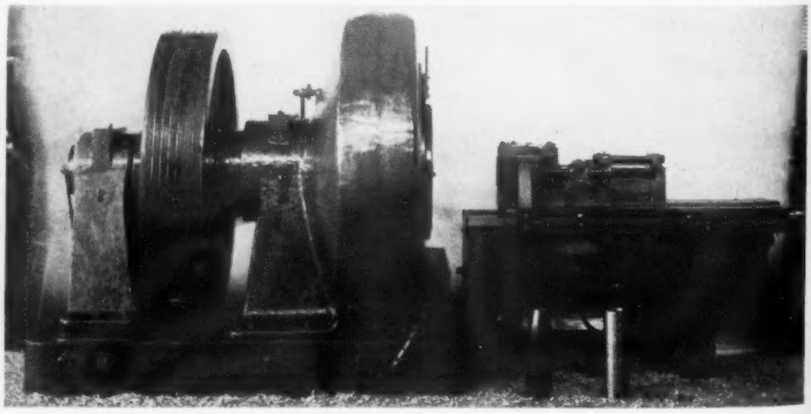
• • •

Swaging Machine—

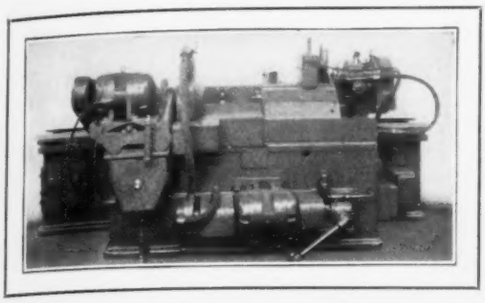
Langelier Mfg. Co., Providence, R. I., announces an improved type L swaging machine which is the largest of this type so far constructed both in size and capacity. It is capable of tapering or reducing work up to a finished diameter of 6 inches, size of work depending on the material, whether it is solid or hollow, the length of contour and whether it is cold or hot swaged. The machine shown in the accompanying illustration was built for swaging shells.

Spindle head has a slot into which the dies and hammerblocks have a sliding fit. The slot is lined with hardened and ground steel plates which are hooked on the ends and riveted onto the spindle. The fixed roll principle of construction is used in the design of the swaging head. Fourteen hardened and ground rolls of special alloy steel are spaced equally in a ring around the head end of the spindle, the ring being forced into the head and lock-screwed in place. The flywheel is mounted on the swaging spindle midway between front and rear bushings. It has a tapered bore and is forced on the spindle and rigidly held in place by a fine threaded nut. Motor is at back on sliding base for tensioning belts.

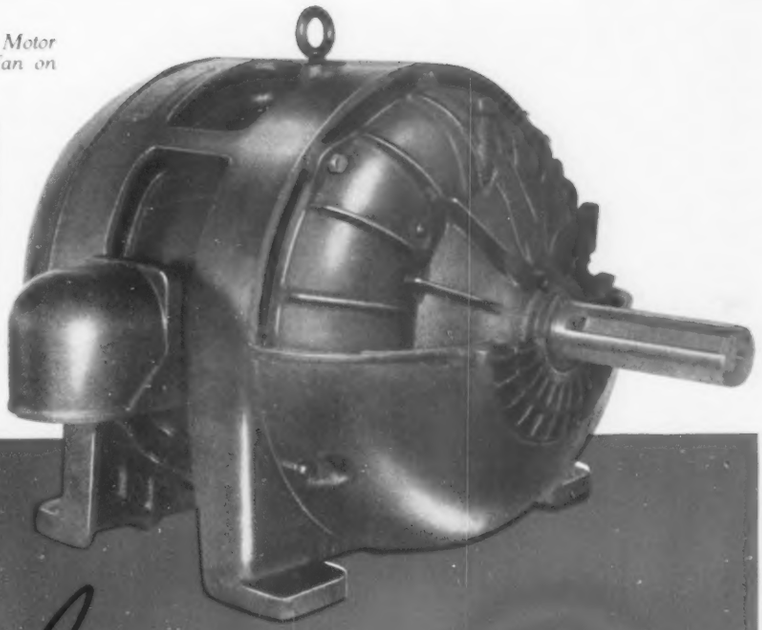
Die opening is obtained by inserting rectangular bars on both sides between the shoulders on hammerblocks and side plates. A thick retaining spindle plate is tongued and lock-screwed into the end of the



Large new Langelier Type L swaging machine is capable of tapering or reducing work up to a finished diameter of 6 inches



F-M Type QZC Enclosed Fan Cooled Motor showing end shield removed. Note fan on shaft.



Protected POWER FOR MACHINE TOOLS

F-M totally enclosed dust-proof motor provides its own two-direction ventilation—seals out metal dust and abrasives

Here's a motor that never gets into trouble because of flying metal dust and abrasives that could get into stator windings or score its shaft. It's protected power for every machine tool need. Motor efficiency steps high when the tool is new and stays high throughout its life.

Its own specially developed two-way ventilation system, including two non-clogging one-piece fans, and its cast-iron enclosing shields guarantees that the motor will not fail in the presence of dust, dirt, metallic particles, steam, moisture, abrasives or even corrosive gases or fumes in the air.

Fairbanks-Morse has built into this motor not only its traditional dependability, but an extra margin of structural refinement and capacity to guarantee correct operation under severe service conditions. And yet it takes no more mounting room and requires no more greasing or other attention than a standard ball-bearing motor.

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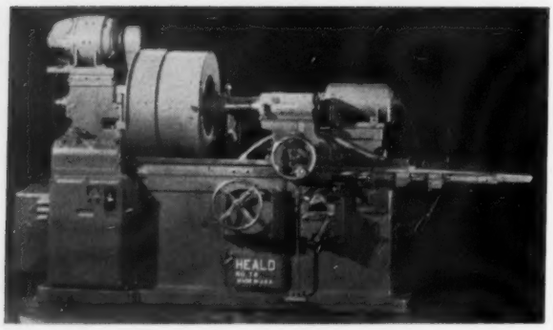

NO. 74 Heald internal grinding machine has large capacity and is designed for handling all kinds of work

spindle for holding the head rolls in place and a lock-threaded plug is used for the dies. Work is fed into the dies by a hydraulic operated holder; it consists of a heavy table sliding on flat ways and is operated by a cylinder mounted in the holder box. Adjustable dogs bolted in a T-slot in the edge of the table control its working cycle. It has a fast advance, slow feed, a pause if required, and a rapid return.

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Internal Grinding Machine—

Heald Machine Co., Worcester, Mass., has developed a new gap internal grinder known as No. 72A and shown in the accompanying illustration. It is designed to handle gears, plates, connecting rods, housings and similar parts, with medium size holes but requiring a generous work swing. It has a grinding stroke of 7½ inches and will swing work 38 inches in diameter by 15 inches in length. The machine weighs 9000 pounds.

By providing a heavy T-head base and low work center an unusually rigid, conveniently operated machine is made available for grinding workpieces that usually are awkward to handle in a rotating work fixture on the average machine. The machine is arranged with a hydraulic drive for the table and a quick acting truing device. The hydraulic table drive gives any speed desired.

The work guard is opened and closed by a hydraulic cylinder and piston at the rear of the machine having a control valve within easy reach of the operator. The work guard swings completely back out of the way to facilitate loading with an overhead crane. The operating units and drives are similar to the regular No. 72A internals of this company.

◆ ◆ ◆

Internal Grinding Machine—

Heald Machine Co., Worcester, Mass., announces its No. 74 internal grinder, a large, heavy machine for handling all kinds of work. This machine is shown in the accompanying illustration. Its general operating features are similar to the successful No. 72; the new unit has been designed for larger capacity. It has swing over table of 14 inches, swing inside standard water guard of 26 inches. It will grind holes up to 20 inches in diameter. Taper may be had to the extent of an included angle of 30 degrees toward front, the maximum angle being dependent on the nature of the work. Weight of the machine is 12,000 pounds.

Base is T-shaped, giving generous support for the workhead. In the lower part of the base is a reservoir for the oil supply, completely enclosed to exclude all dirt and foreign substances. An exceptionally large coolant tank fits close to the rear of the machine and gives an ample supply of coolant without excessive heating.

The rear shaft motor, directly coupled to the oil pump and coolant pump, is mounted on vibration dampeners. Switches for all of the motors are conveniently located at the front of the base in the terminal box. The hydraulic table operation gives unlimited table speeds between minimum and maximum. This smooth, uniform, table operation not only offers fast removal of stock but very accurate and fine-finished holes.

Work holding fixtures, face plates, magnetic chucks, radius truing devices, cross slide for workhead and other attachments can be furnished as extra equipment.

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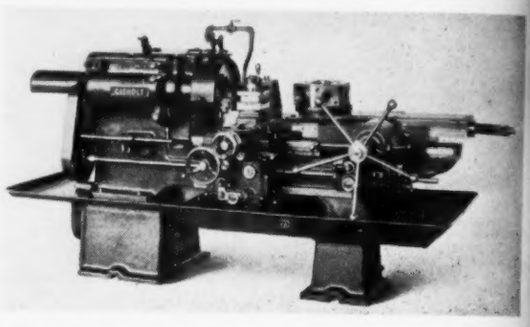
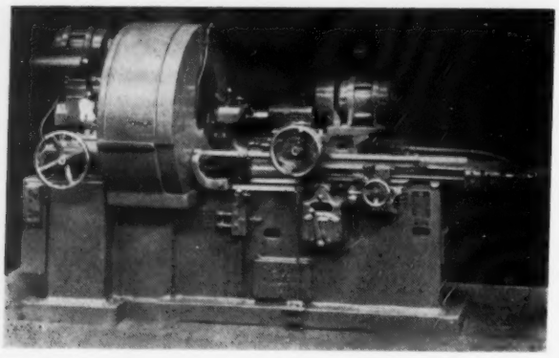
Turret Lathe—

Gisholt Machine Co., Madison, Wis., is bringing out a No. 3 turret lathe as an addition to its line of machines for bar work up to 12 inches in diameter and also for chucking work up to 34½-inch swing over the ways. Both plain and universal models are available. Design for fast manipulation on light work, yet retaining the power and rigidity for heavy work within its capacity, this new lathe, shown herewith, has a bar capacity of 1½ inches diameter by 10-inch length, and a chucking capacity of 9⅝-inches swing over the cross slide or 18½ inches over the ways.



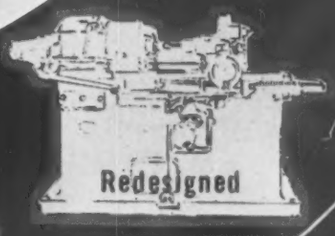
A COMPLETE line of standard tools, extra attachments and optional features adapt this new Gisholt No. 3 turret lathe to the individual and specific manufacturing needs of each user

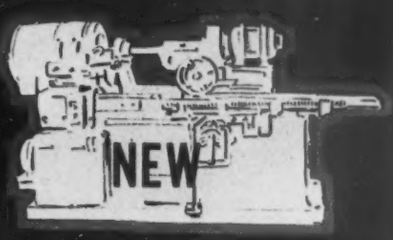
An all hardened and heat treated alloy steel geared headstock provides six spindle speeds and reverse, which may be obtained in the normal speed range of 65 to 730 revolutions per minute for general purpose work, or with a higher or lower range to meet specific requirements. The six speeds are in two groups of three high and three low speeds. A multiple disk clutch between these two groups permits shifting instantaneously without stopping the spindle. A practical application of this is the shifting from a drilling speed to tapping, from boring to

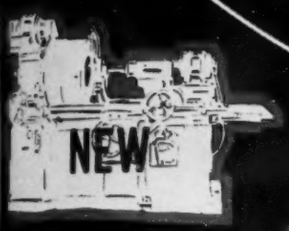


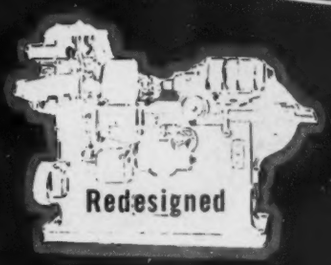
HEALD No. 72A gap internal grinder is designed for work on gears, plates, connecting rods, housings and similar parts and is adaptable to work which ordinarily involves awkward handling

HEALD
PRECISION *Grinding* MACHINES









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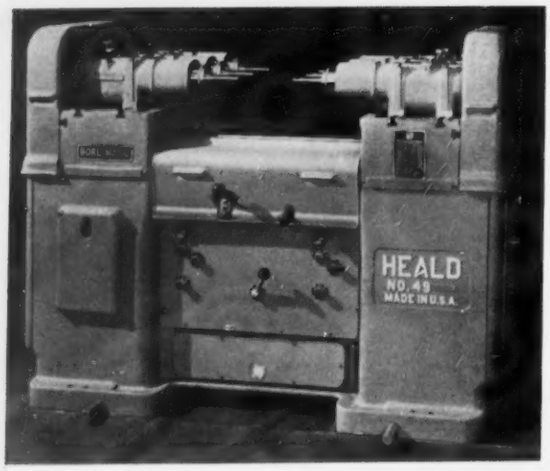
BOOTH 206

ALSO 9 PRECISION *Boring* MACHINES

At Cleveland, out of the 22 Heald machines we will exhibit, 13 will be grinding machines and 5 of these will be NEW and never publicly shown before. These new machines help to round out the Heald line of internals, making it possible to offer a grinder just suited for each customer's needs. Take, for instance, the new No. 74, built to handle work too large for the No. 72A line • a Gap machine for work requiring large swing • a machine for grinding airplane cylinders • centerless internals giving perfect concentricity of the bore with the O. D. In addition, there will be shown the very latest of the other Heald internals, many having been redesigned and improved within a very short time. All machines will be in operation on work now regularly produced in numerous manufacturers' plants. Check them with your present equipment, or one of our engineers present will be glad to give full recommendations on any new work.

THE HEALD MACHINE COMPANY, Worcester, Massachusetts, U.S.A.



NO. 49 Bore-Matic is designed for performing several borizing operations in individual parts from opposite ends or for borizing a number of different pieces at a single setting

reaming, and turning to threading.

A single control lever behind the chuck and on the side of the headstock starts, stops and reverses the spindle through multiple disk clutches. A spindle brake is applied automatically when this lever is in its neutral position. Accidental starting of the spindle is prevented by a safety latch. An automatic turret clamp not only insures the turret being clamped properly and firmly on every forward movement, but also saves the operator the 12 movements otherwise required to clamp and unclamp the turret for each full cycle of the tools.

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Precision Boring Machine—

Heald Machine Co., Worcester, Mass., has developed a low machine for borizing precision holes in large irregular shaped work of various kinds. It is known as No. 45 Bore-Matic. As shown in the accompanying illustration it is set up specially for boring cylinder bores in V-8 cylinder blocks for a high-priced, quality line of automobiles. Four bores on each side of the block are finished in one pass and after the block is placed in the reverse position in the fixture the four bores on the opposite side of the block are borized. The eight bores thus are completely finished in two cycles of the table.

This machine has a reciprocating table and stationary bridge for the boring heads, three to seven in number depending on their size. The low table with its large hydraulic cylinder and liberally proportioned ways operates with exceptional smoothness for either boring or facing. Control panel, unlike other Bore-Matics, is mounted on a floor stand positioned adjacent to the machine and within easy reach of the operator; the panel is made up of pushbuttons which control independently the main drive motor and the rapid table traverse.

Control of boring head and facing feeds is by screw adjustment on the boring and facing valve, the valve being operated from the table cams. The same lever operating the valve also operates the switch that starts the boring head motor and another cam and switch stops the boring head motor. The cycle of operation is generally similar to other similar types of machines built by this company in which the tool approaches the work at rapid traverse and then slows down to borizing feed. The table does not reverse and go to rest position automatically but requires manual operation of the push button control, an advantage on large work.

Drive to the boring head is by multiple V-belts from an idler pulley unit. Speed of boring spindles easily is varied by a simple changing of pulleys. Boring head speeds provided are suitable for small as well as large holes. The machine bores holes from approximately ¼-inch to 9 inches in diameter. Maximum length of hole bored depends on the hole diameter; strokes can be taken up to 18 inches.

◆ ◆ ◆

Precision Boring Machine—

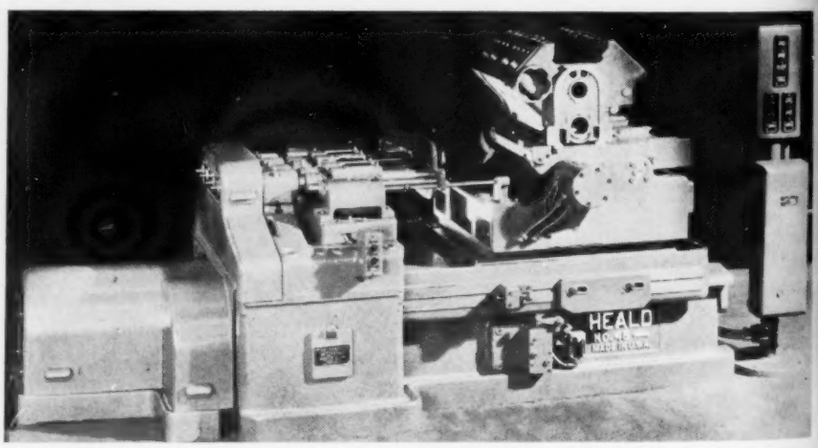
Heald Machine Co., Worcester, Mass., has developed a new, small, double-end, precision boring machine shown in the accompanying illustration and known as No. 49 Bore-Matic. It is designed for performing several borizing operations in individual parts from opposite ends or for borizing a number of different pieces that can be handled at a single setting. Although similar in general operation to the company's 46A Bore-Matic it is smaller.

It weighs approximately 5500 pounds and is of massive construction; through the liberal use of vibration dampeners the transmission of vibration to the boring spindles and work is eliminated. It has capacity for four small boring heads at each end and capacity for boring holes from ¼-inch to 6⅛ inches in diameter. Maximum length of hole bored depends on the hole diameter; total boring stroke, for both ends, is 11 or 15½ inches.

Careful attention was paid to the appearance of this machine. All electric starting and hydraulic controls are built into the base. Well ventilated panel guards at the rear and neatly fitted guards over the belts and dog unit complete the smooth and pleasing lines.

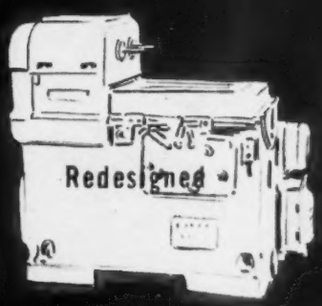
Main drive motor with direct-connected oil pump is mounted on a vibration-dampened plate to isolate any vibration of this unit upon the base. Drive is taken by multi-strand V-belts from this unit to the clutch and brake units which are of the direct hydraulic, self-adjusting type and are mounted on vibration-dampened plates. Automatic metered pressure lubrication is provided for the ways. The massive, well-ribbed base contains an oil tank uniformly spread over the lower portion; an 8-gallon reservoir for cutting lubricant also has been provided in the base.

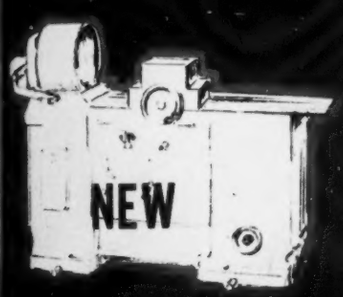
Operating controls for the entire machine are located within a small radius on the front of the base. This includes motor start and stop buttons and table and boring head controls. Cams start the boring heads slightly in advance of the reduction

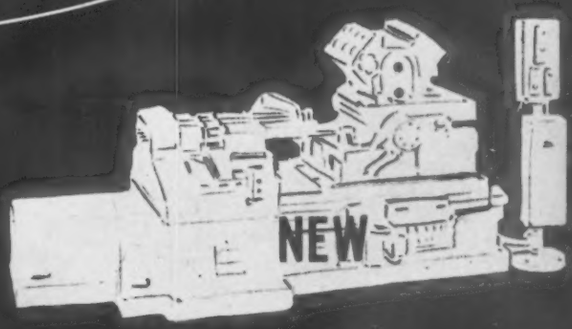


New Heald No. 45 Bore-Matic as set up specially for finish boring of cylinders in V-8 blocks for a high-priced, quality line of automobiles

HEALD
PRECISION *Boring* MACHINES







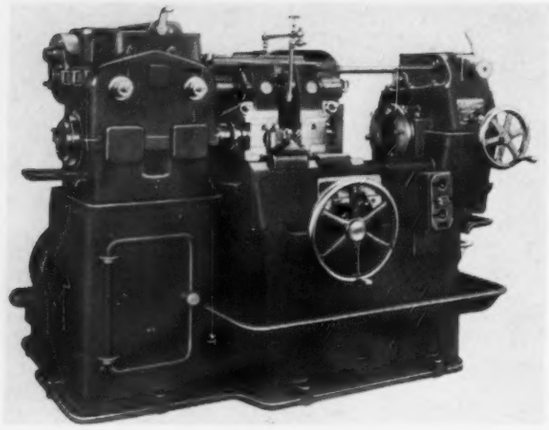
SEE THEM AT THE CLEVELAND SHOW

BOOTH 206

ALSO 13 PRECISION *Grinding* MACHINES

The remarkable advance made in ecision boring can best be seen at the Cleveland Show. Here, t of 22 Heald machines exhibited, 9 will be Bore-Matics and 5 these will be brand new, never shown to the public before. To ntion one or two of these new Bore-Matics . . . there will be a all double-end machine for mass production • a single-end built pecially for manufacturers with miscellaneous work produced in all lots • a large conveyor level Bore-Matic for automobile cylinders and other large work • a Bore-Matic especially built for facing and grooving. These, together with our previous machines (many of which have been redesigned and improved), will complete a showing of precision boring machines that will meet practically any manufacturer's requirements. In addition to this array of machines, there will be samples of work now being finished on Bore-Matics. Check them for accuracy and finish. Ask what the production is. See for yourself what Heald Precision Boring can do for you.

THE HEALD MACHINE COMPANY, Worcester, Massachusetts., U.S.A.



IN THIS Farrel-Sykes gear generating machine the operating parts of each cutter head are lubricated by an individual pump which uses the relieving bar as a pump piston

to boring speed. Special cams may be made to jump gaps at rapid traverse speed. Standard equipment includes boring valves and end stops. Facing valves, intermediate stops and arrangements for boring in both directions and cutting lubricant attachments may be furnished.

♦ ♦ ♦

Gear Generating Machines—

Farrel-Birmingham Co. Inc., Buffalo, announces that it has incorporated in its latest type gear generating unit improvements which enhance the accuracy of the product, increase output and facilitate operation. Although having extreme rapidity of action, the new features of design make the machine, shown herewith, remarkably quiet in operation.

A new type of cutter relief mechanism improves the accuracy and finish of the work and makes it possible to perform new machining operations which are entirely disassociated from gear cutting. It positively and automatically withdraws the cutters from the work during their return stroke and thus prevents damage to the cutting edges of the tools. During the cutting stroke a mechanism locks the housings carrying the cutter spindles with the cutter heads.

A new automatic in-feed or depth feed arrangement has been developed which automatically feeds the work toward the cutters in any desired increment per revolution of work, and these increments may be uniform or variable as required. Embodied in this mechanism is a device for withdrawing the work from the cutters when the finish cut has been taken, and for stopping the machine.

The mounting for the main spindle has been changed so that the main indexing worm wheel can be secured in place on its spindle before fitting to the machine, a detail that improves accuracy of manufacture. Special means prevent binding when the worm is lifted out of position for truing up the work.

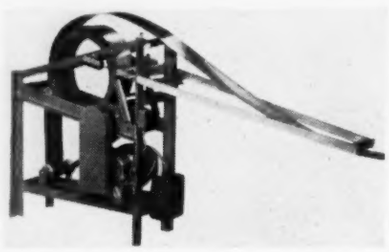
In addtion to their ability to cut herringbone gear with continuous teeth having sharp apices, Sykes machines also will generate any known type of herringbone gear, as well as straight tooth and single helical gears with external or internal teeth, splined shafts, cluster gears, sprockets, angle gears and a variety of other toothed forms and special contours.

♦ ♦ ♦

Semiautomatic Grinding Machine—

Norton Co., Worcester, Mass., has developed a new, hydraulically-operated, 6-inch, plunge-cut machine which, as is the case with the 10-inch machine, can be built semiautomatic or traverse or both. Furthermore, it it possible to convert one to the other even after the machine has been installed in the plant of the customer should changes in his manufacturing methods necessitate or make desirable such a conversion. The 6-inch machines are offered in 18 and 30-inch lengths; the accompanying illustration shows a 6 x 18-inch machine.

With semiautomatic machines the operator simply loads and then moves a lever which starts the automatic cycle. When this lever is moved the work starts rotating, the grinding wheel is fed in rapidly until it contacts the work whereupon the grinding wheel speed is reduced and kept at the reduced rate until the workpiece has been ground to the correct size. Then the grinding wheel recedes rapidly, the work stops rotating and the main control lever returns to its initial position. The operator then replaces the ground piece with an unground piece and again moves the lever.



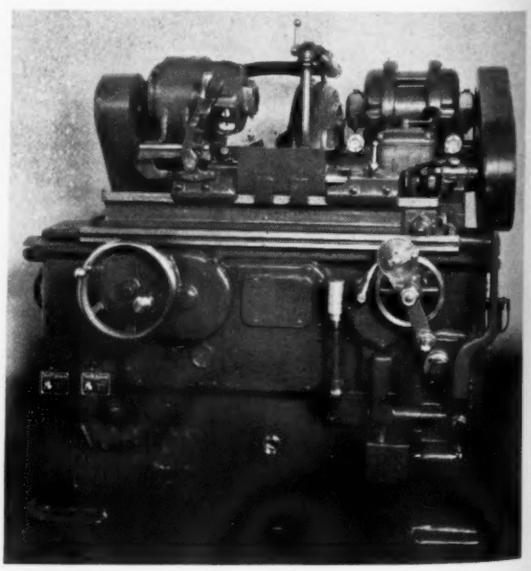
Henry & Wright stock reel eliminates back pull against press roll feeds and at same time prevents undue slack

♦ ♦ ♦

Stock Reel—

Henry & Wright Mfg. Co., Hartford, Conn., has developed a new automatic, motor-driven, cradle-type stock reel. Shown in the accompanying illustration, it permits material to be dropped into a cradle instead of being loaded upon the spindle as in conventional reels. The new loading feature is of distinct advantage when heavy coils are used.

Geared motor drive is provided, the motor being controlled by a mercury switch actuated by balanced arm resting upon material between coil and roll feed of press. This control stops the motor before sufficient material is fed to allow material to touch the floor and starts the motor before material is pulled tight between press and coil. Thus, pos-



WITH new Norton 6-inch hydraulically operated plunge-cut grinder it is necessary only that the operator load the machine and pull a lever

COORDINATION . .

● The *cadenza of the virtuoso* requires the utmost in skill and coordination. Without these, we have the wail of discords. Similarly, in steel making the high quality of the finished product depends upon skill and coordination. The correct use of the proper ferro-alloys is an important point of control.

Since 1906 Electromet has been making the right ferro-alloys. Electromet Metallurgists will show you how to use them under the right conditions. If you are not entirely familiar with this service, let us send you a copy of the folder "Electromet Products and Service." Write for it.

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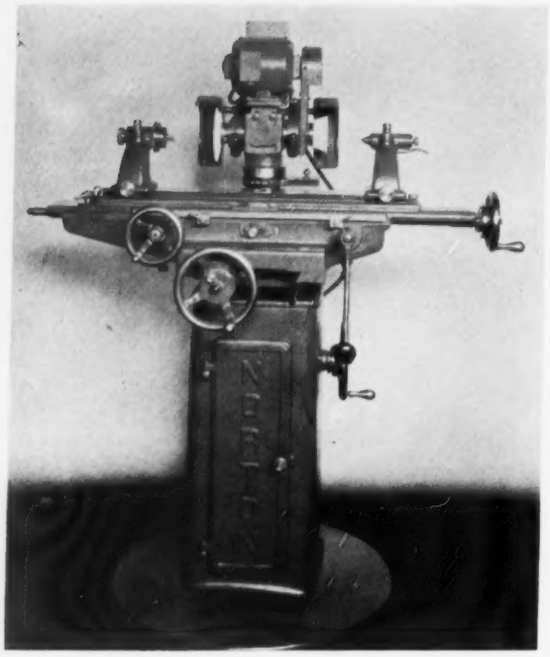

NORTON No. 1 universal tool and cutter grinder has new features

sibility of back pull against the roll feed of the machine, so objectionable when intricate progressive dies involving pilots are used, is entirely eliminated. Due to automatic control and motor drive, the reel operates without attention from the machine operator. That shown in the illustration will handle coils up to 500 pounds in weight.

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Radial Drill—

Fosdick Machine Tool Co., Cincinnati, announces a 5-foot, 17-inch column radial drill which represents an effort toward greater simplicity and ease of controlling power movements. Power to drive this drill is obtained from a motor mounted on the arm, connected through a reduction gear to the back driving shaft of the head. This motor also drives the hydraulic pump for supplying fluid power for control and traverse of head and arm.

As shown in the accompanying illustration, the arm is of rigid double-box construction, with ribbing and sections so disposed as to give maximum rigidity with minimum overhanging weight. This arm is mounted on the column sleeve on a sliding bearing of generous proportions and is clamped to the sleeve by a hydraulic self-locking clamp. Raising and lowering of the arm is effected through a hydraulic clutch using nitralloy plates. The sleeve rotates on the inner column mounted on a heavy ball bearing at the top and a pair of roller bearings at the bottom; thus the arm swings readily.

The head is well balanced on the arm and properly gibbed to attain rigidity and ease of movement. It has 36 speed changes; 18 feeds from 0.003 to 0.125-inch per revolution; and incorporates three pipe leads, 14, 11½ and 8-thread. Feed is engaged by a friction clutch; a direct-reading dial serves as a depth stop. A rapid traverse lever on the right side of the head, self indicating for direction, hydraulically traverses the head at any speed up to about 15 feet per minute.

The various handles for controlling the movements of the arm and head are so mounted as to return to neutral position as soon as released. This drops the pressure in the hydraulic system to practically zero, thus conserving power. Movement of any handle instantly restores pressure.

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Tool and Cutter Grinder—

Norton Co., Worcester, Mass., announces a new machine known as its No. 1 universal tool and cutter grinder. It has a large, heavy base which is in a box casting, and long saddle ways of the dovetail type. A gib at one side has readily accessible adjusting screws. It can be furnished with such equipment as a universal work head with motor drive arrangement, combination attachment, universal vise, internal grinding attachment, universal 3-jaw chuck and face chuck.

The new machine, shown in the accompanying illustration, can be operated from front or rear, the cross feed being provided with a handwheel at both points and which is graduated in thousandths. Furthermore, the table can be operated by a feed screw from a handwheel at the end, also graduated in thousandths, and can be transferred from one end to the other. Likewise, a table operating lever and a handwheel at the front are provided for traversing the table. This handwheel can be used at either side or in corresponding positions at the rear of the saddle. The same applies to the table operating lever. The grinding wheel spindle is of the cartridge type and units with plain bronze bearings, ball bearings, or with double-taper bronze bearings are available.

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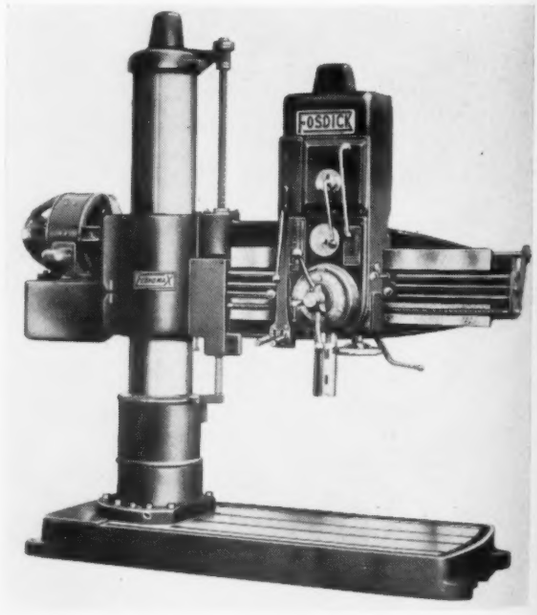
Turret Lathe Cross Slide—

Warner & Swasey Co., Cleveland, has developed a new heavy-duty turret lathe cross slide designed to give better performance than previous cross slides and particularly for use on heavy cuts and coarse feeds such as demanded with cemented tungsten carbide cutting tools. The severe strains imposed by such heavy cuts are absorbed with the result that vibration is eliminated.

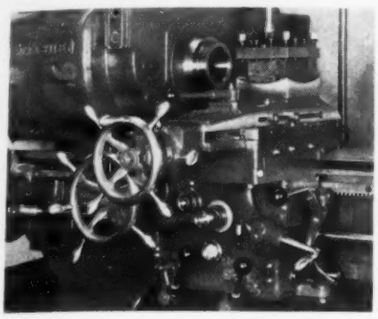
As shown in the accompanying illustration, a square lock gib is provided on the right side of the cross



GREATER simplicity and ease of controlling power movements are incorporated in this new Fosdick 5-foot 17-inch radial drill

slide. The flat surface of this gib presents an ideal means of taking the load for it at all times is at right angles to the load pressure. Another feature is found in the hard steel, replaceable, wear strips which have been added to the dove-tail guide of the cross slide for preserving the initial accuracy of the unit.

The square turret mounted on the cross slide is another new development. By removing the characteristic center stud through the turret, greatly improved rigidity is possible and better facility for clamping of overhanging tools. The index and clamp handle is located behind the square turret, thus preventing interference; this feature permits indexing of the square turret in the "tight" position.



Warner & Swasey turret lathe cross slide is designed for vibrationless heavy cuts and coarse feeds with tungsten carbide cutting tools; on it is mounted the new square turret

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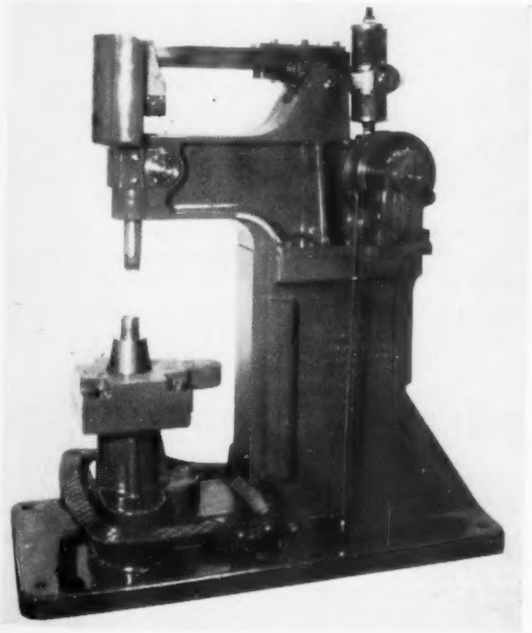
Riveting Hammer—

High-Speed Hammer Co. Inc., Rochester, N. Y., has developed a high-speed riveting hammer known as No. 7B, which is shown in the accompanying illustration. It is intended to meet the increasing demands in connection with heavy cold riveting. It will cold head successfully 1½-inch diameter mild steel rivets, forming oval heads in 30 seconds each; it will perform similar work on ¾-inch diameter rivets in 7 seconds each. In the case of riveting flanges a much greater diameter can be handled. The new hammer also is capable of performing many swaging and forging operations. Its use permits the substitution of rivets and studs in assemblies where screws and bolts are used.

The new hammer weighs approximately 5000 pounds and is of heavy, rugged construction. It carries patented new and improved features both on front and rear. It has a horizontal gap of 15½ inches, and overall height of 74 inches and it occupies floor space 28 x 64 inches.



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HIGH-SPEED riveting hammer is designed for heavy cold riveting; it also performs many swaging and forming operations

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IN this new Hut-O-Lap, gears are lapped by a new inclined axis principle by which heat treated gears may be lapped so as to operate quietly and smoothly

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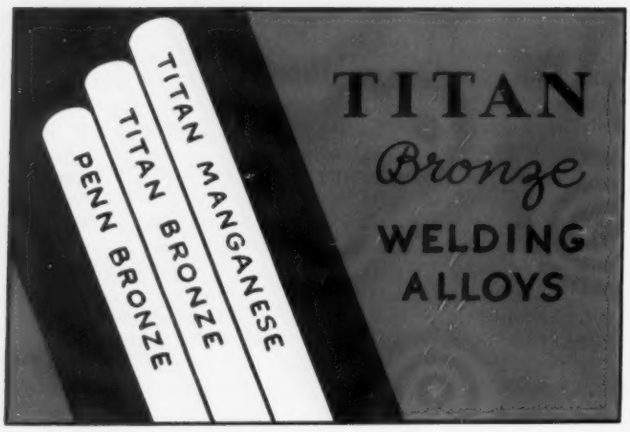
Gear Lapping Machine—

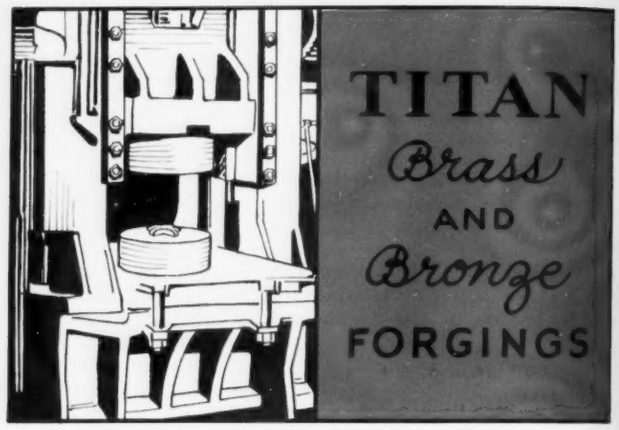
Carborundum Co., Hutto Machine Division, Detroit, announces a gear lapping machine, known as Hut-O-Lap and shown in the accompanying illustration. It embodies a new inclined axis principle of lapping by which, it is stated, heat treated gears may be lapped to an entirely new degree of tolerance. Lapping of gears in this manner is said to eliminate the necessity for gear selection and mating It is said to correct such gear evils as bearing wobble, end bearing, cross bearing, profile distortion, index error, eccentricity and destruction of tooth profile. The method is said to result in quieter, smoother gear operation.

The new method accomplishes these results by inclining the axes of the lapping members to the work pieces in such a manner that the normal line of rolling contact is transferred from one parallel to the axis of the work piece to one which diagonally intersects the conventional pitch line This inclination of the lapping members results in a transference of the attending sliding action both above and below the transferred lines of rolling contact, subjecting the conventional pitch line to a sliding action from the point of intersection of the transferred line toward the face extremities of the gear tooth flanks. In this manner, frictional or abrasive action is produced along the normal pitch line of the gear tooth by rotary motion only, without increasing the sliding movement between the other contacting portions of the gear teeth.

The new machine is fully automatic, with all driving mechanism mounted in the base. It has capacity for outside work diameters up to

TITAN Products





TITAN products are well and favorably known by many old and substantial customers. Our close adherence to quality standards—our ideals of workmanship maintained over a period of two decades—has stamped the house of Titan with the mark of consistent quality.

Brass pressure castings by Titan, Titan brass and bronze forgings, Titan doubly-deoxidized bronze welding alloys, and Nittany free turning brass rods have demonstrated their superiority to a host of manufacturers in the past and they will continue to do so in the future.

Your striking up an acquaintance with Titan and Titan products may mean an early improvement of your product, at real savings in manufacturing costs.

Let us hear your problem. You will not be obligated.

Titan Metal Manufacturing Company

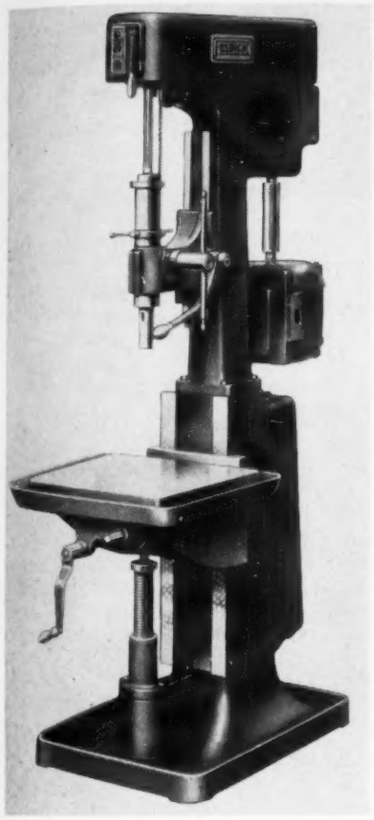
Brass and Bronze Products

Bellefonte, Pennsylvania

8 inches and lengths up to 12 inches. Gears being positional anywhere in length. The maximum outside diameter of lap is 12 inches and the maximum travel of reciprocating stroke is 5 inches.

This machine laps simultaneously two or more gears on the cluster type of work piece. It has pneumatic, abrasive-paste feed. No attachments are needed for processing either spur or helical gears. It laps both right and left-hand members of herringbone gears simultaneously. It simultaneously laps both sides of the work piece tooth.

The center distance of laps to work



Fosdick No. 4 sensitive drill equipped with handwheel feed. A wide range of speeds is available

piece is adjustable, resulting in economy in the use of one type of laps for processing any number of teeth of one characteristic within the range of the machine capacity

♦ ♦ ♦

Sensitive Drills—

Fosdick Machine Tool Co., Cincinnati, announces two new sensitive drills, one designated as No. 4 and the other as No. 5. The No. 4 drill, shown in the accompanying illustration, is driven by a direct-coupled motor drive. The motor has two speeds and with a 3-speed gear box mounted in the rear of the machine, a total of six speeds ranging from 225 to 1800 revolutions per minute is derived.

When equipped with a sensitive tapping attachment of the reversing-motor type, control is effected by the motion of the rack pinion handwheel; when the spindle is brought down, it runs right-hand, when the spindle is raised, it reverses. An adjustable depth stop backs out the tap at any predetermined point. Bottom tapping is performed very accurately.

The No. 5 drill is similar in type to No. 4, except that it has a power feed instead of hand feed. Power feed is engaged by downward motion of the handwheel and disengaged by upward motion. It also has a depth stop which disengages power feed and is accurate to within 0.010-inch hole depth; depth of feed is set on a direct-reading graduated dial.

Power feed or reversing tapper control can be applied to either No. 4 or No. 5 drills. No. 4 has a drill capacity of ⅞-inch in cast iron, and is built in 16, 24 and 30-inch sizes; No. 5 has a capacity of 1¼ inches in cast iron and is built in 16 and 24-inch sizes. Both machines may be obtained in from one to six spindles, in any combination of speeds or special attachments.

♦ ♦ ♦

Arc Welder—

Harnischfeger Corp., Milwaukee, announces a newly improved line of heavy-duty arc welders. Most important changes and refinements include the new oversize, 2-bearing armature shaft, removable ball bearing capsules, more simplified single-current control, dustproof calibration plate, heavy-duty, built-in polarity switch and drip-proof housings.

The new 200-ampere machine, shown in the accompanying illustration, retains the previous P & H-Hansen generator design with patented internal stabilizer coils embedded in the main pole tips, unique short circuit winding and magneto bridge which broaden the welding range and improve the uniformity of

New heavy-duty Harnischfeger arc welder embodies numerous important changes and refinements

current. General outward appearance of the 300 and 400-ampere units is identical.

Motors have solid cast frames with top opening for terminal leads and mounting of the magnetic switch-type starter. It is equipped with no-voltage release and overload protection operated by push buttons. A constant flow of cooling air circulated by the large aluminum fan between motor and generator is discharged at the end of the all-welded generator housing. Connections are available for standard or special voltages of 2 and 3-phase, 60 and 50 cycles. Gasoline-powered units in a wide variety of stationary and portable mountings also are included in the new line.

♦ ♦ ♦

Lapping Machine—

Norton Co., Worcester, Mass., announces an entirely new lapping machine which is operated hydraulically and designed for the high production lapping of flat work up to 6 inches across its longest dimension or cylindrical work up to 6 inches in

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NEW Hyprolap operates hydraulically and is designed for high production lapping of flat and cylindrical work up to 6 inches long

◆

Compact No. 202 New Britain hydraulic unit has many uses

length. Shown in the accompanying illustration, it is known as the Hyprolap.

The work travels in a circular path between bonded abrasive laps rotating in opposite directions and at different speeds. Two hydraulic cylinders, one on each side of the upper lap spindle, raise and lower the upper lap and also provide pressure to the work during lapping. This upper spindle also is counterweighted so that the pressure applied is actually the pressure on the work.

The machine is driven by motor through a clutch and brake, the drive being carried to the upper lap by a standard automotive universal joint and multiple V-belts. The machine is rigid and powerful and is said to be capable of turning out work at production rates not hitherto equaled.

♦ ♦ ♦

Compact Hydraulic Unit—

New Britain-Gridley Machine Co., New Britain, Conn., is introducing a compact hydraulic unit for operating chucks or work fixtures on any type of machine. If the unit, shown herewith, is operated with one machine only, a single control valve is employed; but if used with a battery up to four machines a multiple control valve is substituted. A constant-speed, fractional-horsepower motor builds up a reserve pressure against an air cushion in an accumulator. This patented design permits the rapid action of air chucks with the convenience and smooth action of hydraulics. Chucking pressures are adjustable instantly to any pressure desired, with a range of from 50 to 300 pounds. The unit is available for application to all types of old or new machines requiring power-operated chucking equipment.

♦ ♦ ♦

Sheave for Texrope Drives—

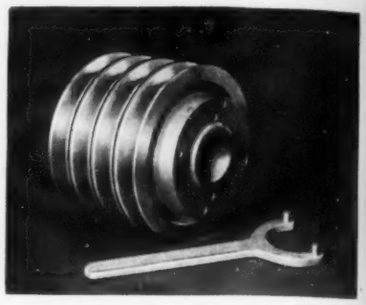
Allis-Chalmers Mfg. Co., Milwaukee, has developed a new Vari-Pitch sheave permitting variable speed Texrope drives. It is shown in the accompanying illustration. These sheaves have pitch diameter adjustment to vary speed 15 to 25 per cent with one sheave; with both sheaves Vari-Pitch the speed range doubles. These sheaves are made in two multigroove types, one adjustable when drive is stationary and the other for speed control with sheaves in motion. Standard Texrope belts are used.

♦ ♦ ♦

Connecting Rod Hone—

Carborundum Co., Hutto Machine Division, Detroit, has developed a new type of hone for use on a high-production basis on connecting rods and other short bores which may be aligned through the use of a suitable fixture. Shown in the accompanying illustration, this hone is known as model RA. It permits honing of more than one bore at a time by using a suitable fixture of the floating type; the lower end of the hone serves as a pilot for aligning the bores.

As with the company's new cylinder finishing hones, the connecting rod hone has segmental members consisting of abrasives and fibers; the fibers act as guides to align the bores when the hone is in operation and they permit the hone to be withdrawn without marking the bores. They also equalize wear on stones.



New Vari-Pitch sheave permits variable speed in Texrope drives

The stoneholders are expanded and contracted automatically. The new hone is fitted with the company's new feature, an adjustment for expanding the fiber guides separately and independently of the stone adjusting mechanism.

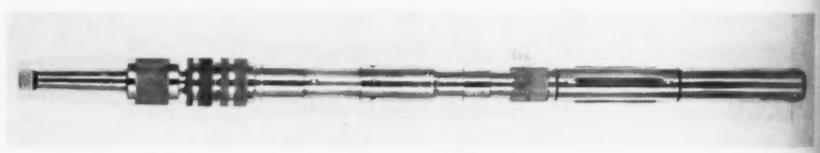
♦ ♦ ♦

Electronic Dynamic Balancing Machine—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has developed an electronic dynamic balancing machine, shown herewith. Unique in that with the aid of a stroboscopic tube the point of unbalance is visible during operation regardless of speed and the amount of unbalance is read directly on a calibrated meter, this machine eliminates many of the objections associated with mechanical devices. Applications have included small rotors from 1¼ to 3 inches diameter, medium size rotors up to 100 pounds, and large rotors weighing as much as 125 tons.

In previous machines the mechanical element was required to separate the two unbalanced effects as well as to support and rotate the rotor. In the new unit this separation as well as the unbalance indications are made electrically. This removal of the function of separation from the mechanical element allows the use of almost any mechanical set-up, permitting many unbalancing operations heretofore impractical.

Because the unbalance force is not



Hutto model RA hone has been designed specially for honing connecting rods and other short bores on a high-production basis

◆

ELECTRONIC dynamic balancing machine developed by Westinghouse Electric & Mfg. Co., is applicable for use in the field without calculations or special skill on the part of the operator

◆

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Spider for a large power shovel being cut on the Oxweld Shape Cutting Machine from ⅜ in. steel. It measures overall 24 x 12⅛ in.

NEW and greatly improved oxy-acetylene cutting machines for shaping parts out of stock steel sheets, plates and slabs are establishing new low cost levels for metal working. Oxweld Cutting Machines make these economies readily available in any plant.

There are various types of Oxweld Cutting Machines: partly or fully automatic, portable or stationary and with various capacities suitable for practically all classes of work and almost any size or thickness of metal. All the work illustrated herewith was done with Oxweld Cutting Machines, indicating the wide variety of work which can be fabricated with these flexible and modern production tools.

Quick Work at Low Cost

The substitution of mechanical shape cutting for hand cutting and rough machining, wherever practicable, results in better workmanship and greater accuracy, speed, and economy. Oxweld Cutting Machines are designed to meet the exact needs of such substitution. They are precision machines and are capable of making cuts in steel of such quality and accuracy that for many purposes little or no finishing is required.

Available from Linde

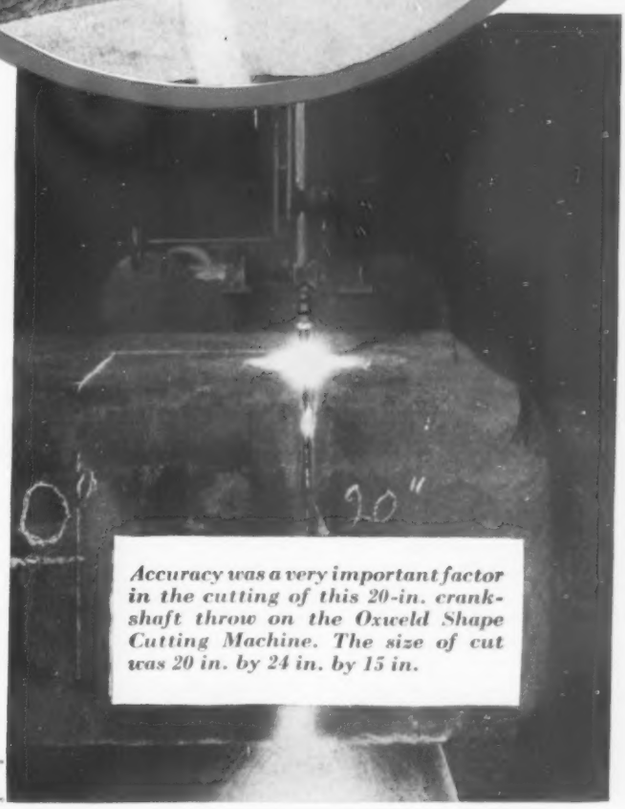
Oxweld Cutting Machines are available through all Linde Sales Offices. Without obligating you in any way, the nearest one will

OXWELD WELDING AND CUTTING APPARATUS AND SUPPLIES · LINDE OXYGEN · UNION CARBIDE

Special T sections for the construction of a large crane were quickly cut to the necessary size from I-beams with Oxweld Secator Cutting Machine.

Above: A pressure plate for a moulding press cut from 8½-in. steel. It measures 65 in. by 32 in. The four round guide holes are also shape cut and bronze bushed.

Right: Cutting 4-in. thick curved plates for the Boulder Dam penstock system with an Oxweld Monitor Cutting Machine. The machine follows the templet to give the desired irregular curve.



Accuracy was a very important factor in the cutting of this 20-in. crankshaft throw on the Oxweld Shape Cutting Machine. The size of cut was 20 in. by 24 in. by 15 in.

gladly send a Linde representative to help you develop a quick picture of what oxy-acetylene machine cutting can do in your plant. Linde Sales Offices are located in thirty principal cities throughout the country and at 30 East 42nd Street, New York. Address The Linde Air Products Company, Unit of Union Carbide and Carbon Corporation.

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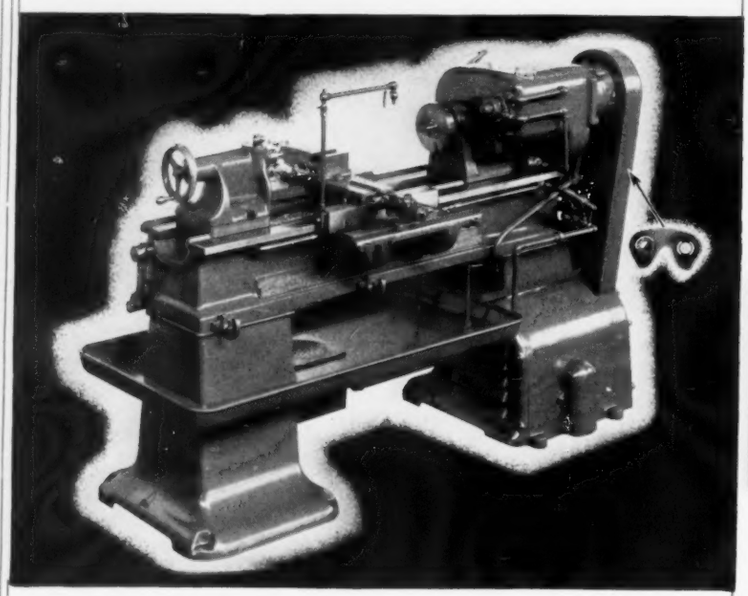

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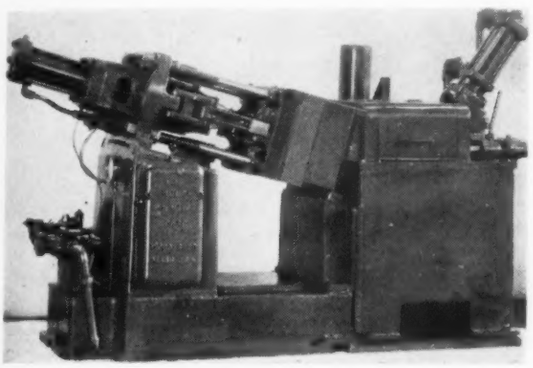
required to vibrate the mass of a carriage, the machine is inherently more sensitive. With the rotor rotating in the balancing machine the only manipulation necessary is the operation of two electrical switches giving direct readings of unbalance for both correction planes without the usual mechanical changes and without stopping the rotor. Also, all errors due to building vibration are eliminated even though the vibration might be at the frequency of rotation of the balancing machine.

◆ ◆ ◆

Die Casting Machine—

Reed-Prentice Corp., Worcester, Mass., has developed a die casting machine of full automatic type with electric timing mechanism allowing the operator to set the machine for any predetermined period for the solidifying of castings from zero to 20 seconds. The machine can be arranged for automatic or manual operation. It is impossible to shoot the metal until the dies have been securely locked.



REED-PRENTICE die casting machine operates hydraulically throughout by fully automatic or manual means, as desired

The new machine is operated hydraulically throughout with one standard Vickers oil pump; control valves for the die cylinder as well as the plunger cylinder are standard Vickers product. Operating links are of cast steel bushed with hardened bearings and pins with facilities for lubricating.

When the dies are constructed for automatic ejection, the castings drop from the dies into a box or chute. As shown in the illustration, there is plenty of space for access to the dies and for automatic ejection. The die plates are planed on four sides, allowing for application of core pulling attachments.

The machine is made in three sizes, having piston diameters of 2½, 3¾ and 4¼ inches with pressures, respectively, of 4900, 11,000 and 16,000 pounds.

◆ ◆ ◆

Lathe—

Seneca Falls Machine Co., Seneca Falls, N. Y., announces a new so-called Lo-Swing Unitlathe. Shown in the accompanying illustration, it offers new and wider flexibility of application simultaneously with maximum production and economy of investment. It is designed and built on the unit principle.

LO-SWING Unitlathe is a base machine on which interchangeable functional units may be assembled when the machine is built or later in the consumer's plant if required

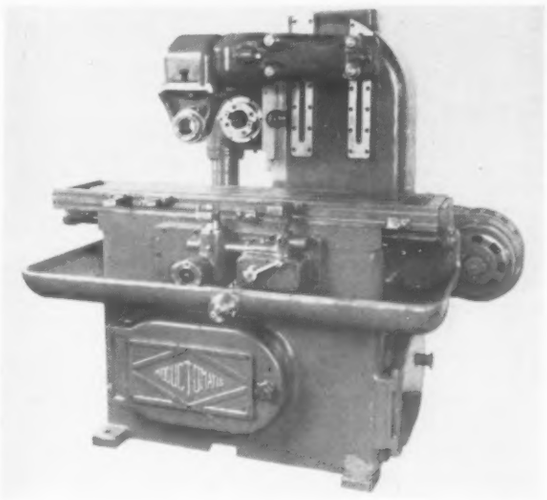
A base consisting of an integrally cast bed and headstock mounted on a cabinet base which houses the motor, coolant tank, and pumps and forms the chip pan is the foundation of the new machine. Standardized and interchangeable functional units assembled into this base machine when built, or later as required, provided a complete and versatile lathe of a type suited to the work in hand. Thus a machine arranged for plain turning may be economically converted to any type, up to and including a full automatic.

An outstanding characteristic is the manner in which each functional unit as incorporated becomes merged or absorbed into the complete machine design, providing everything in appearance that could be expected of a specially designed, single-purpose machine. It is designed to give full advantages of tungsten carbide and other high-speed cutting tools.

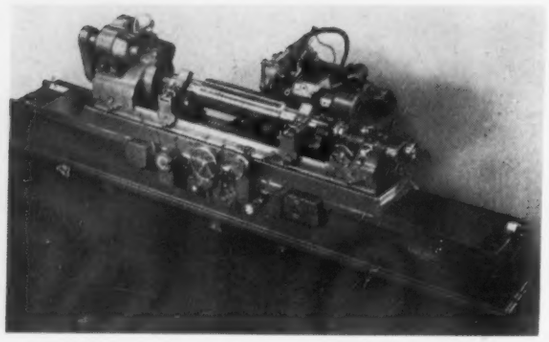
◆ ◆ ◆

Milling Machine—

Producto Machine Co., Bridgeport, Conn., announces a new milling machine known as Producto-Matic No. 28. Shown in the accompanying illustration, it is a manufacturing type miller of medium size adaptable for miscellaneous milling operations on any type of work. It brings out certain new lines of design. A modern and attractive cabinet base mounting is used to support the machine and to enclose certain features such as the transmission for the machine to the feed, as well as the cutter speed. Pick-off



PRODUCTO-MATIC milling machine has wide adaptability in performing miscellaneous milling operations



ALL electrical control buttons on this Cincinnati roll grinding machine are located conveniently at the operator's position, and are enclosed in two boxes. Control levers have been grouped to provide easy and fast operation

change gears are used for obtaining changes in feeds and speeds. A large reservoir holding the coolant to the cutters is found in the base of the machine.

A desirable feature is the length and size of the work table to permit long cuts. This table is supported practically its entire length, an unusual feature. A quick traversing mechanism returns the table at speed of 300 feet per minute. Range of table feed is ⅞-inch to 12½ inches per minute for cutting.

Cutter spindle also is of unique design. It is mounted on a heavy column and is adjustable vertically on the face of this column to locate the cutters for different classes of work. Thus the adjustment is made in the cutter spindle bearing and not by elevating the table. Cutter spindle bearing is driven by a worm and worm gear and this drive is close to the nose of the cutter spindle.

A new and better design of overhanging arm is provided, this being secured in two directions for added rigidity. The machine takes a 3-horsepower motor, using V-belt and pulley to drive to the main driveshaft. It is equipped with full lubricating system, including oil pump, piping and necessary tubing.

The machine is claimed to have wider adaptability for miscellaneous milling operations in many plants making sewing machines, typewriters, automobile parts, electric units and similar products.

◆ ◆ ◆

Roll Grinding Machine—

Cincinnati Grinders Inc., Cincinnati, announces many improvements in its roll grinding machine, shown herewith, making it simpler to operate and capable of producing more accurate work having a higher quality of finish. The unit is built with 20, 24 and 28-inch swing and distance between centers up to 192 inches. Capacity to take cuts ranges from the roughing of chilled alloy iron rolls to the most sensitive finish and accuracy cuts.

Wheel truing now is independent of any other unit on the machine. A hydraulic cylinder located behind the wheel guard supplies the motive force for traversing the diamond across the wheel. The wheel can be trued either perfectly straight or with a slight crown as necessitated by the type of roll. A single directional control lever determines the direction of travel of the truing tool across the wheel, while the setting of a knurled knob determines the rate of traverse.

A new "radial type" of spindle bearing increases the accuracy and finish obtainable.

Two types of cambering mechanisms are available. One is a bar type device, the flexibility of which allows a wide variety of concaves or crowns to be ground on the roll. It also is desirable for finishing rolls having a number of different curvatures.

The cam type cambering device consists essentially of a train of pick-off gears and a cam which are driven by the machine table, and a tilting wheel head that is operated by the cam. A hydraulically-operated backlash device, automatic in action, eliminates the "play" from the entire mechanism. Accuracy is positive and dependable, and the camber is a known quantitity, synchronized with the table movement.

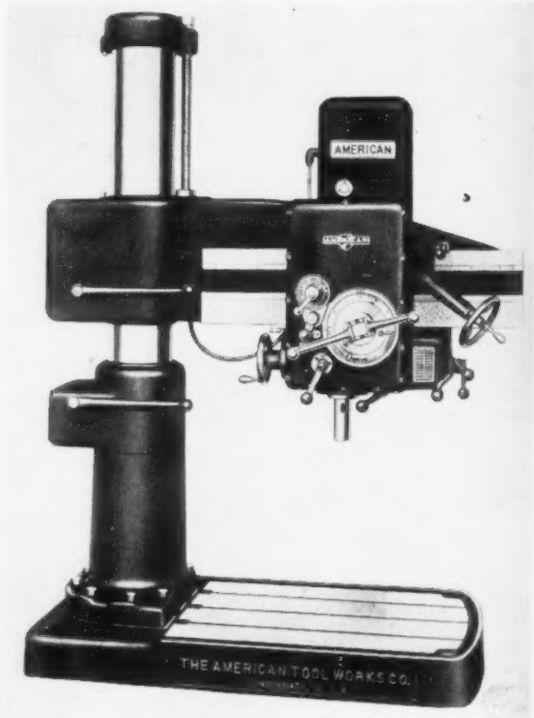
◆ ◆ ◆

Radial Drill—

American Tool Works Co., Cincinnati, is introducing a new American Super-Speed Hole Wizard radial drill in 3-foot and 4-foot 9-inch column sizes featuring higher speeds, lower drilling costs, less operating effort and minimized maintenance. Equipped with a 5-horsepower built-in motor, economical drilling capacity is approximately 2 inches diameter in cast iron and 1½ inches in steel; tapping capacity 2-inch tap in cast iron and 1½-inch tap in steel.

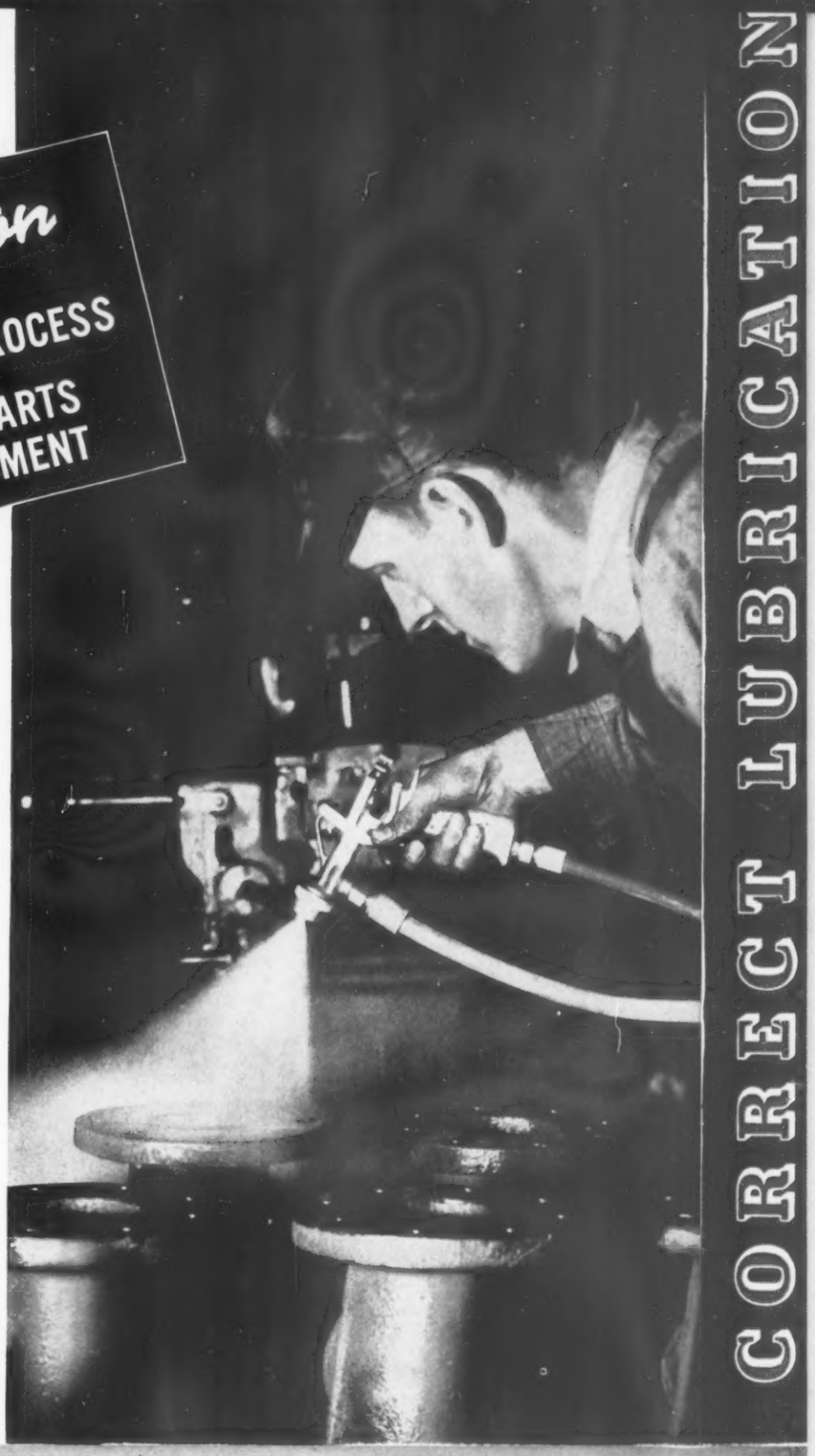
This drill, shown in the accompanying illustration, is provided with 18 spindle speeds in geometrical progression, covering a standard range of 35 to 1500 revolutions per minute. By pick-off gears this range may be changed to suit requirements, for example, 50 to 2200 revolutions, or 70 to 3000 revolutions. The entire range of spindle speeds is obtained through three levers. Spindle reverse required for tapping is accomplished in about 1½ seconds by an almost instantaneously reversing motor.

The head is completely antifriction and is automatically oiled by pump. Its traverse is effected by a large handwheel. All speed changing mechanism is located within the head casting as is also the spindle feed unit. Spindle and sleeve are of nitrided Nitralloy steel; the spindle is roller bearing mounted and provided with adjustment for wear. The spindle is driven at the bottom of the



HIGHER speeds and lower drilling costs are features of this American 18-speed Hole Wizard radial drill built in 3-foot and 4-foot 9-inch column sizes

Rust Prevention for: 1. PARTS IN PROCESS 2. FINISHED PARTS AND EQUIPMENT



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CAREFUL selection of cutting fluids, determination of safe oil-water proportions with soluble oil—these things are vital safeguards against the rusting of parts in process.

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Williams threading tool holder insures perfect threads since when resharpening the cutter it is necessary to grind its top edge only

head to eliminate possible vibration.

Six rates of geared power feed are provided, including 0.004, 0.007, 0.011, 0.014, 0.017 and 0.025-inch per revolution of the spindle, and all are direct reading. Provision is made for application of a power tap leading unit. A greatly improved automatic trip for feed operates up to 12 inches at one setting.

Power elevating and lowering is accomplished by a ¾-horsepower motor. The column is clamped and unclamped by an impingement-type of clamping mechanism controlled by a convenient lever. Tables of either plain box type or universal type can be provided.

♦ ♦ ♦

Work Driver—

Seneca Falls Machine Co., Seneca Falls, N. Y., announces a new automatic work driver shown in the accompanying illustration and designed to eliminate dogging time so that one operator can run two or more machines. It is adaptable with all makes of turning and grinding machines. Eccentric driving jaws are mounted on a guided slide which is free to adjust itself to any eccentricity between the center and the outside diameter of the work, thus balancing the gripping pressure of the jaws and eliminating all strain on the head center. The slide is mounted in a guide way giving positive drive and eliminating chatter, thus increasing tool life.

Breaking of tools through slippage is avoided as the harder the pull the tighter the grip of the work

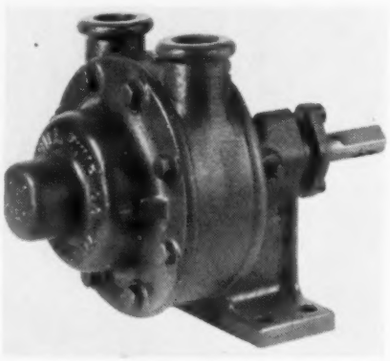
Seneca Falls automatic work driver designed to eliminate dogging time so that one operator can run two or more machines; it can be used on all makes of turning and grinding machinery

driver. Body is recessed on back side and can be attached to a chuck plate or directly to the spindle by four bolts. Jaws with coarse serrations are furnished for gripping forgings or rough bar stock and with fine serrations for parts that have been turned. The driver also can be supplied where it is necessary to grip on a taper.

♦ ♦ ♦

Threading Tool Holder—

J. H. Williams & Co., 75 Spring street, New York, announce the addition to its Agrippa line of tool holders of a new threading tool holder with a formed cutter. Shown in the accompanying illustration, it is available in two sizes, Nos. 150 and 151. The high-speed steel formed-cutter



Without valves, this Tuthill reversing pump discharges from same port regardless of direction in which shaft is rotating

is said to assure threads that fit perfectly since in resharpening the cutter it is necessary to grind its top edge only. The point always retains the proper form and angle as originally supplied. The cutter is ground to an included angle of 60 degrees and is backed off for proper clearance. A hardened set screw bearing against the rear flat edge, which is eccentrically formed, provides not only positive but highly accurate adjustment.

♦ ♦ ♦

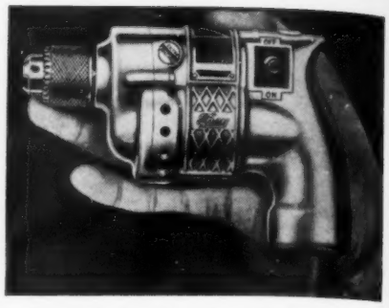
Reversing Pump—

Tuthill Pump Co., Chicago, announces a new automatic, reversing pump for service up to 100 pounds pressure, known as Model RC. It is so designed that without the use of valves it will discharge from the same port regardless of the direction of shaft rotation. The new pump, shown in the accompanying illustration, is built in sizes ranging from ½ to 50 gallons per minute capacity.

♦ ♦ ♦

Portable Drill—

Independent Pneumatic Tool Co., Chicago, has developed a Thor portable electric drill weighing only 2½ pounds but with the same



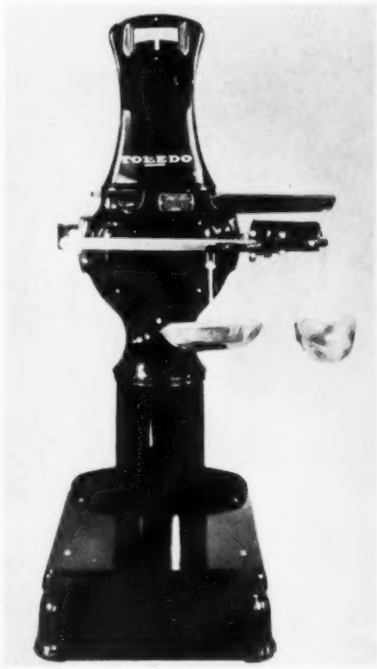
Thor portable electric drill weighs 2½ pounds; it drills through ¼-inch steel plate in 5 seconds

power as the usual tool twice its size. It is made in two sizes, U-14 and U-13. The former has capacity for ¼-inch drilling, free speed of 2500 revolutions per minute and overall length of 6¾ inches. It will drill through a steel plate ¼-inch thick in 5 seconds. The latter has capacity of 3/16-inch drilling and free speed of 3750 revolutions per minute. As shown in the accompanying illustration, it fits easily in one hand and serves equally well in production and plant maintenance.

♦ ♦ ♦

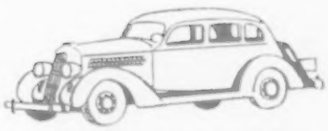
Counting Scale—

Toledo Scale Co., Toledo, O., announces a new bench-type dial counting scale shown in the accompanying illustration. It is provided with double photoelectric cell and electric automatic taring attachment for continuous and automatic operation. It is designed for use in conjunction



New Model E Toledo dial scale operates continuously and automatically in connection with electric vibrator conveyors. It is equipped with 9 to 1 and 99 to 1 ratio counting attachment

Agricultural Machinery Builders



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Bottle Makers

You'll meet them at the Machine Tool Exposition in Cleveland, Ohio, September 11-21, 1935. They will attend to see in operation the modern tools for industry, to keep step with industrial progress. They will find it profitable to visit the LeBlond Booth No. 1001. Whatever your business, the LeBlond exhibit will touch it at some point, and the experience of 50 years of successful machine tool building will be at your service.

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THE R. K. LeBLOND MACHINE TOOL CO.
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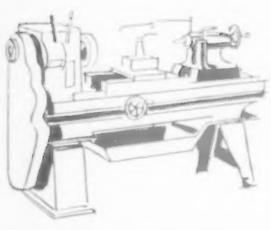
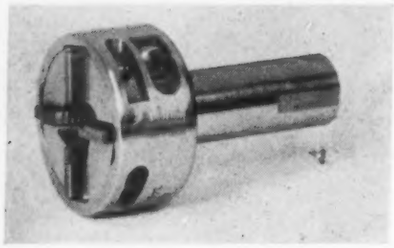


Vocational Schools



Insert chasers can be used in new H & G, solid, adjustable die head

with electric vibrator conveyors. It is equipped with a 9 to 1 and 99 to 1 ratio counting attachment. This ratio system is a recent development which practically eliminates the human element in counting of parts. The scale is adapted to counting parts of exceedingly wide range.

• • •

Lubricating System—

Farval Corp., Cleveland, announces its new Type C automatic, centralized system of lubrication. Advantages of this system are said to include increased machine production, better finish, reduced power consumption, lowered maintenance costs, elimination of shut-downs for repairs and prolonged life of equipment. Positive, piston-displacement valves of different capacities are located at the bearings and control the delivery of lubricant to the central pumping unit by means of a single main line of tubing.

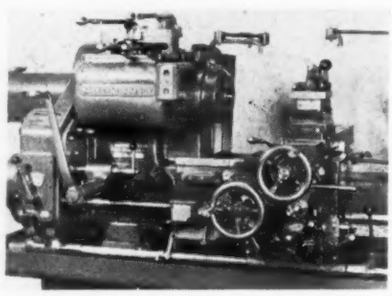
This unit, shown in the accompanying illustration, is compact, simple, rugged and fully enclosed. Its design has been so simplified that it actually contains only two moving parts. Check valves, stuffing boxes and other features have been eliminated. An adjustable timer accurately governs the operation of the new system whether the frequency be 5 minutes or 2 hours. When desired, the entire system can be arranged to start and stop with the machine to which it is applied.

Farval lubricating system has numerous improvements resulting in more efficient and less costly lubrication

• • •

Die Head—

Eastern Machine Screw Corp., New Haven, Conn., announces a new H & G, solid, adjustable die head in which can be used the same insert chasers that are used in the regular line of self-opening die heads made by this company. The new tool, shown in the accompanying illustration, is intended for manufacturers who are accustomed to using solid die heads and to enable them to take advantage of the low cost, high endurance and great accuracy of the insert chaser. Weight of the new solid die heads is approximately 25 per cent of that of the corresponding self-opening head. They come in three capacities, 0 to ½-inch, 17/32 to ¾-inch and 25/32 to 1-inch; larger sizes will be made to order.



Lead screw for Warner & Swasey ram-type turret lathes is designed to simplify screw cutting operations and to supply greater accuracy than hitherto possible

• • •

Turret Lathe Lead Screw—

Warner & Swasey Co., Cleveland, announces a new lead screw for ram-type turret lathes. Screw cutting operations on turret lathes, says the company, have been the source of much trouble and annoyance because of the lack of adaptability of such attachments. The new lead screw, shown in the accompanying illustration, is designed to overcome such difficulties and simplify this operation.

The feed shaft leading to the apron of the cross slide is utilized for the lead screw but only that portion of the shaft which hitherto has been unused. This provides a positive thread and completely eliminates the conventional leader which must be gripped to the shaft at some predetermined point by means of a collar on the threaded nut. The new lead screw further supplies accuracy such as heretofore has been known only on engine lathes where a special screw is provided for threading. To engage the follower with the lead screw, the operator merely presses a lever on left side of apron, a simple interlocking mechanism preventing this engagement whenever the feed clutch of the apron is engaged.

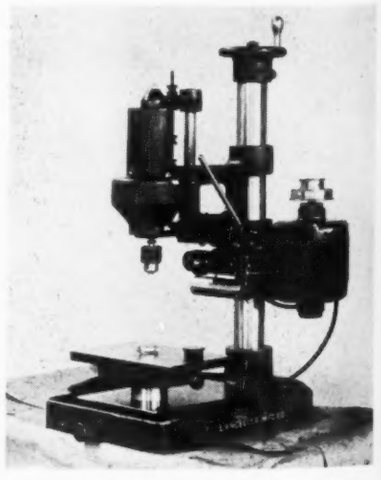
Threads of any standard pitch from 2 to 56 are available through pick-off change gears mounted at the head end gear box. Design of this unit makes it possible to return the carriage without reversing the spindle.

• • •

Sensitive Drill—

Langelier Mfg. Co., Providence, R. I., announces an improved, high-speed, super-sensitive bench drilling machine similar to its A type. The newly designed drill, shown in the accompanying illustration, has a deeper gap from the chuck to the column and a new subtable mounted on trunnion in the center of the base plateau which can be swiveled and clamped in any circular position or removed so as to permit work to be drilled on the base plateau. It also has a new arrangement for adjusting belt tension. It may be supplied with one, two or three speeds. Minimum and maximum speeds range from 200 to 8000 revolutions per minute. It has capacity of ¼-inch in steel.

A novel feature is an encased small electric light bulb, mounted directly back of the chuck whose casing has a narrow opening that instantly can be adjusted to focus the light beam on the end of the drill. Constructional features consist of an accurately ground steel column forced into hub on the base plateau, and a head casting carrying the spindle and feed mechanism. The



Langelier high-speed, super-sensitive bench-drilling machine has improved features

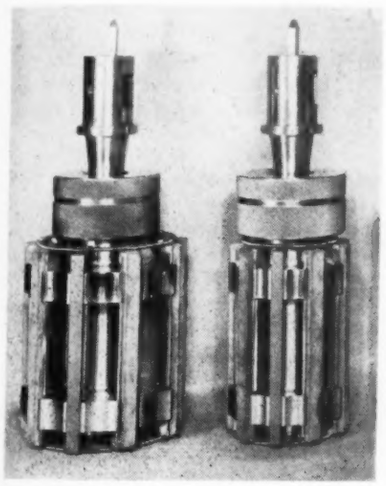
head has vertical adjustment on the column and can be clamped in any desired drilling position.

The drilling spindle is hardened and ground and has a sliding fit in a sleeve mounted on two grease-seal ball bearings housed in two hubs in the head casting driven by a breached double-keyed sleeve nut engaging splines in the spindle. This mounting eliminates belt pull on the spindle and insures an accurate and sensitive feed to the drilling spindle. Spindle feed is actuated by a yoke engaging a small pinion attached to the end of the hand feed lever. A radial, grease-sealed, thrust ball bearing is mounted on the top end of the spindle and housed in the head of the feed yoke. This radial thrust ball bearing counteracts the drilling thrust.

♦ ♦ ♦

Cylinder Finishing Hone—

Carborundum Co., Hutto Machine Division, Detroit, announces a line of cylinder finishing hones shown in the accompanying illustration. These



In the new Hutto cylinder finishing hones expansion and contraction of the abrasives are accomplished manually

hones are essentially the same as the company's automatically controlled, high-production, finishing hones with the exception that the expansion and contraction of the abrasives are accomplished manually by setting up the adjustment on the drive head which is employed for driving as well as controlling expansion and contraction of the stones.

Segmental members of the hone consist of abrasive fibers. The abrasives remove stock and finish the bore whereas the fibers act as guides when the hone is withdrawn preventing the stone from marking the hone. A new feature is a separate adjustment in this tool for expanding the fiber guides separately and independently of the stone adjusting mechanism. As a result, life of the fiber guides is long.

♦ ♦ ♦

Non-Sparking Wrench—

J. H. Williams & Co., 75 Spring street, New York, announce a new line of non-sparking, safety wrenches for use where fire hazards exist. Shown in the accompanying illustration, they are drop forged from beryllium copper and accurately heat treated. They are recommended for superior strength, toughness and hardness; tests prove them practically as strong as steel wrenches of similar design and size. They are noncorroding and nonrusting and are finished in safety-green enamel and with heads polished bright and opening sizes stamped on them. They can be had in single and double-head patterns in a wide variety of sizes.

♦ ♦ ♦

Portable Hydraulic Riveter—

Hannifin Mfg. Co., Chicago, announces a new type of hydraulic, production riveting machine comprising a portable, yoke-type, hydraulic press and an automatic, hydraulic pressure generator, connected by high-pressure hoses and electric control cable. This equipment is shown in the accompanying illustration. The yoke press weighs only 54 pounds and develops maximum pressure of 35,000 pounds to head the rivet. This capacity is ample for ⅜-inch cold iron rivets. Previously hydraulic presses of this capacity have weighed approximately 300 pounds.

Throat of the yoke is 6 x 6 inches and the ram stroke 3 inches. Maximum pressure developed on the dies may be adjusted to suit the work. Control of the riveting operation is by a single push button at top of press handle. Depressing this button actuates the hydraulic pressure generating unit and its control valves and the riveting cycle is completed automatically.

The hydraulic pressure generator

Williams non-sparking, safety wrenches are forged from beryllium copper and hence are corrosion and rust resistant as well as practically as strong as steel wrenches

is a completely automatic power unit with electrically actuated valves and oil pump control. It is driven by a 2-horsepower motor and the outside dimensions are 32 x 17 x 56 inches. The generator provides large volume delivery at moderate pressure for rapid advance stroke of the press ram, automatic step-up to high pressure for the actual heading of the rivet and automatic reversal upon reaching maximum pressure, with rapid reverse stroke of the ram to starting position. Complete riveting cycle is 2½ seconds per rivet. In addition to weighing little, the press is provided with spring suspension so that it is easy to handle.

Because of the high speed with which it operates the press is provided with essential safety features. The design provides against repeat strokes. There also is an instantaneous safety stop which operates at any point in the riveting cycle so that the operator can catch and prevent the stroke if the rivet head is not in the die or if the rivet is crooked in the hole.

♦ ♦ ♦

Upright Drill—

Fosdick Machine Tool Co., Cincinnati, has developed a new upright drill which is available in 21, 25 and 30-inch sizes with either round or box column. This machine is ruggedly built and is suitable for uni-

◆

HANNIFIN portable, hydraulic riveter, shown at the left, has capacity for cold heading rivets up to ⅜-inch and has adequate safety features. It is operated by the completely automatic pressure generator shown at the right

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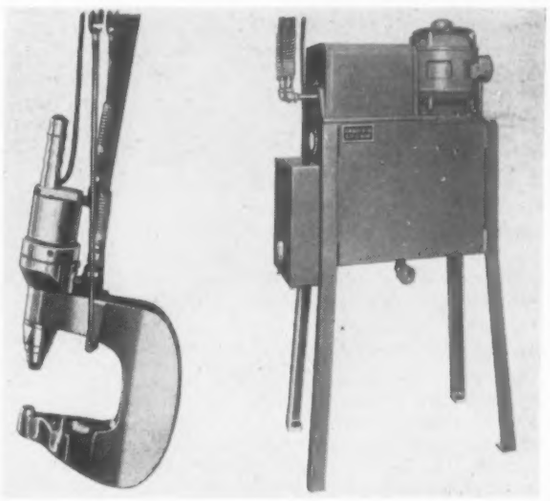


FOR the fine, smooth feed and positive tool relief so essential for diamond turning or boring, the hydraulic operation of the new Porter-Cable lathe is a decided advantage

versal or production use. It has 12 spindle speeds ranging from 60 to 1500 revolutions per minute, and nine feeds ranging from 0.005 to 0.043-inch. A single lever affords control for both feed and speed changing. Equipped with a compound table which has an indicator and gaging means, work is accurately positioned for boring. The drill or reamer is suported in a guide bushing below the spindle. Gages cover the full range of cross and horizontal movement.

• • •

Die Filing Machine—

Illinois Tool Works, Chicago, announces a new die filing machine shown in the accompanying illustration. It uses any type or size file that can be held in a ½-inch chuck. The table is 12 inches in diameter and tilts to an angle of 20 degrees in two directions. The hole in the table has a removable bushing to make room for large files, saws or stones. Space between the table center and the overarm is 6¼ inches and the overarm may be removed to handle large work.

The machine is operated by a ¼-horsepower motor through V-belt at two speeds, 600 and 450 strokes per minute. Length of stroke is 1½ inches. All movable parts are oiled by forced lubricating system. Design of the oiling system is such that the oil takes up the impact of the spindle, making a very smooth-running machine. Weight of the machine is 125 pounds.

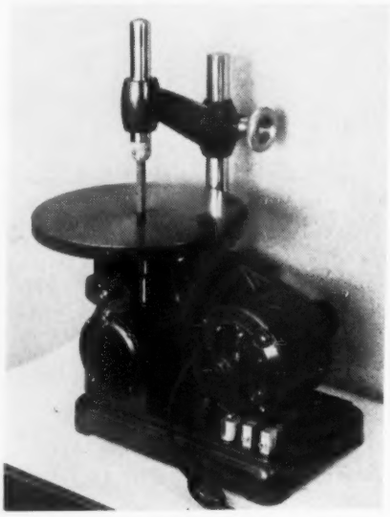
• • •

Hydraulic Lathe—

Porter-Cable Machine Co., Syracuse, N. Y., is calling attention to its new hydraulic lathe. The unit, shown herewith, is a full-automatic "cycle" unit, a feature which enables one operator to easily operate two or more machines. An important factor in this new design is the hydraulic power feed to the cross slide of the front carriage.

Lathe operators are benefitted by the automatic cycle which, because it eliminates a couple of manual operations, reduces operator fatigue. Loading time also is reduced, resulting in increased production per unit of time. On short cycle operations loading time also is decreased by the quick starting and stopping of the spindle.

For fine, smooth feed and positive tool relief so essential for diamond turning or boring, the hydraulic operation of the Carbo lathe is a decided advantage. This type of system is independent of the spindle drive and is operated by a separate motor. Starting and stopping of the spindle starts and stops the flow of coolant, thus obviating the need for an auxiliary coolant control valve.



Illinois die filing machine uses any type or size file that can be held in a ½-inch chuck and operates at 600 or 450 strokes per minute

High points in the specifications include spindle speeds of 95 to 1130 revolutions per minute with low speed head; speeds of 167 to 1978 revolutions per minute with high-speed head; 18 inches between centers; swing 14 inches over ways and 7 inches over carriage; and any desired feed from 0 to 24 inches per minute.

• • •

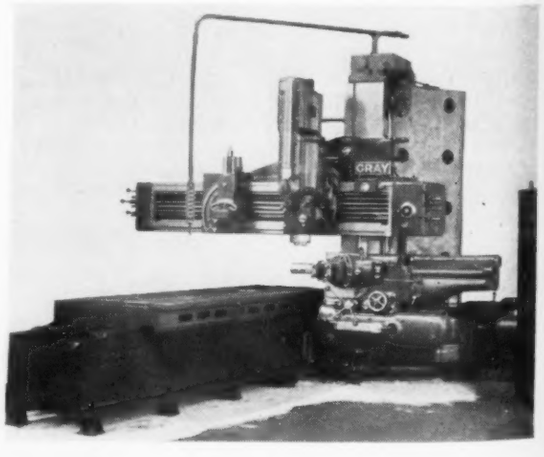
Milling Planer That Also Bores and Drills—

G. A. Gray Co., Cincinnati, recently introduced a machine which combines the speed of a milling machine with the accuracy and simplicity of tooling of a planer. Without changing the setting of the job, the operator can plane or mill, bore or drill. Consequently set-up time as well as cutting time is considerably reduced. Furnished with an automatic precision setting device for table and heads, the machine, shown herewith, is highly efficient for machining all types of jigs and fixtures.

When equipped with duplex tables, a job can be set-up on one section of the table while another job is being machined on the other section, or both tables can be used simultaneously for extra long work. To convert the machine from a planer to a miller, or vice versa, takes but a few seconds. The unit is built both in open-side and double-housing types with any number and combination of milling or planing heads.

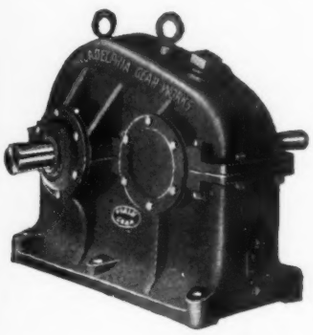
Table and heads must be set with precision when boring and drilling exacting work such as jigs and fixtures. This is accomplished practically automatically and with unusual accuracy when the milling planer is equipped with a high-speed precision setting device. This mechanism is built into the machine and must be specified in the original order as it

WITHOUT changing the setting of the job it is possible to plane or mill, bore or drill with this new Gray milling planer. Consequently, set-up time as well as cutting time are considerably reduced



MODERNIZE and ECONOMIZE with

Philadelphia Power Saving Products



Philadelphia Herringbone Speed Reducer

Philadelphia Speed Reducing Units

Many firms have found these units provide the most economical method of transmitting power from prime mover to driven machine. Philadelphia Speed Reducers are made in worm, herringbone, spur, spur and bevel, and spiral-bevel herringbone gear types, and will meet any requirement for straight line, right angle or vertical drives. They are compact, quiet, safe, dirt and moisture proof and will give long efficient service without trouble.

Philadelphia Worm Gear Reducer

Philadelphia Horizontal MotoReduceR

The Philadelphia MotoReduceR

These modern single-unit drives combine in one housing both motor and speed reducer. They are so compactly constructed that they take up very little floor space, and being in one unit, they require no separate base plate. Time for installation and alignment is reduced to a minimum. The units possess great strength and rigidity and operate with practically no noise or vibration. Their 97% efficiencies make them extremely economical to operate.

The MotoReduceR is made for both horizontal and vertical drives in single, double and triple types.

Philadelphia Vertical MotoReduceR

Philadelphia Limitorque Control

This new and different valve operating device has been installed and is working satisfactorily in more than a thousand plants and industries throughout the country, to take care of both normal and emergency conditions. The Limitorque Control automatically holds to a predetermined limit the torque applied to the valve. It is compact and totally enclosed, thus assuring trouble-free operation.

Philadelphia Limitorque Control

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Industrial Gears and Speed Reducing Units

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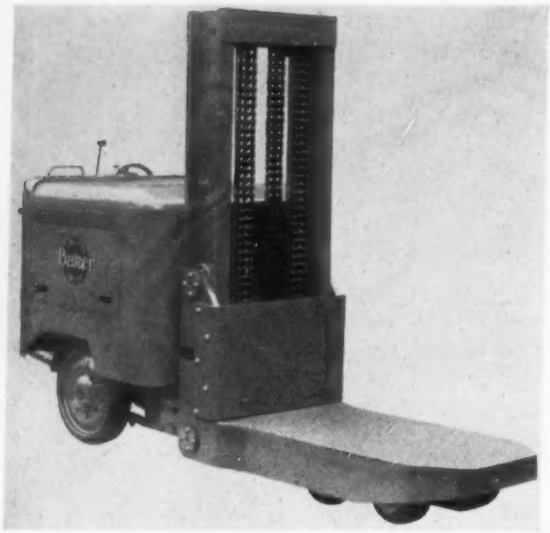
☐ Have your representative call on me.
Send me literature on the following:
☐ Worm Gear Reducers ☐ Herringbone Reducers ☐ The MotoReduceR ☐ Limitorque Control

Mr. _____ Title _____

Firm _____ Address _____

S-9-2-35



BAKER - RAULANG HyLift truck is of streamline design and is stronger and operates more satisfactorily than its predecessors

cannot be added later. Its use makes possible the production of interchangeable work without the use of large jigs or fixtures.

Every precaution has been taken to safeguard the machine as well as the operator. Safety devices are provided for all the feed and power traverse mechanism. It is impossible to throw in the automatic feed of the table or head when the cutter is not running and thus injure the spindle. Also the cutter cannot be stalled in the work inasmuch as the feed is thrown out automatically before the spindle motor is seriously overloaded.

Automatic feed control can be furnished as an extra feature. This arrangement regulates the feed to maintain constant horsepower input into any spindle regardless of the varying depths or widths of cut or hardness of the material.

♦ ♦ ♦

Lift Truck—

Baker-Raulang Co., Cleveland, announces a new 5-ton HyLift truck. As shown in the accompanying illustration, its appearance is in keeping with the modern trend toward clean design and the elimination of sharp angles and unnecessary outward component parts by placing all of the control and operating mechanism possible within the battery compartment enclosure.

The operating mechanism has been as radically redesigned as the outward appearance, resulting in a stronger truck which operates more satisfactorily. Hoisting is accomplished by two double alloy steel roller chains each having capacity of 46,000 pounds, giving a safety factor of 9.2. The hoist unit is a quadruple-reduction spur gear unit with all gears of heat treated alloy steel and having all shafts mounted in ball or roller bearings. Cut-out control switches protect the motion of the platform at upper and lower limits of travel and further protection is afforded by an over-running clutch in the hoist unit.

Construction of the truck is rugged throughout and the unit is so designed that it moves freely over rough floors without transmitting road shocks or twisting strains to the frame or steering mechanism. Both the travel and hoist motors have overload capacity of 300 per cent of the rated load for 30 minutes. The truck can be furnished in any desired height of lift or platform length.

♦ ♦ ♦

100 to 150-Ampere Contactors

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is placing on the market a new line of 100 to 150-ampere De-ion contactors that have a high rupturing capacity. Compact in design, these units are flexible in application and are suitable for built-in use. De-ion arc shields confine the arc flame so that the electrical clearance around the arc members may be reduced to a minimum.

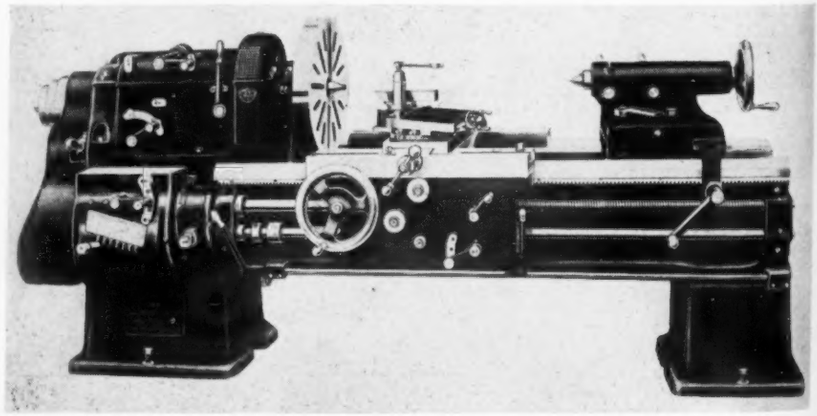
When the contact of the device separates the arc is forced instantly into the De-ion grid chamber and as the current passes through the zero point of the cycle, the air between the plates is de-ionized almost instantly and the arc extinguished. The contactors utilize an E-type magnet with the armature travel essentially vertical. The assembly contactor on its U-shaped steel frame can be mounted easily on a steel base or any standard panel material. All parts are accessible from the front.

♦ ♦ ♦

Lathe—

Cincinnati Lathe & Tool Co., Cincinnati, announces an improved design of lathe which is featured by a number of exclusive, patented conveniences. The new design already has been incorporated in an 18-inch, 8-foot toolroom lathe, and in a 22-inch, 10-foot, geared-head, heavy-duty lathe. The latter is shown in the accompanying illustration, fitted with a special double rest permitting a series of cuts to be taken simultaneously with a number of cutting tools. Beds of these lathes are cast of a mixture containing 80 per cent steel and 1 per cent nickel, combining wear-resisting surfaces with ability to withstand severe strain.

Twelve spindle speeds are obtainable in geometric progression by simply shifting three levers and the speed required, from lowest to highest, is obtained direct without going through unnecessary changes. The number and range may be increased considerably when desired. The company's quick change gear box is fitted as a unit to the front of the new lathes. With it from 32 to 96 changes are made to secure any thread and feed desired by simply shifting two levers and without the use of an auxiliary quadrant. Clutch of the compression disk type transmits full horsepower rating of the motor. It is operated by a lever on the apron or the one on top of the head for starting and stopping the lathe at once. Thus drifting and ac-



Cincinnati lathe design has numerous exclusive features; this illustration shows the design as incorporated in a 22-inch, 10-foot, geared-head, heavy-duty lathe

cidental starting when not in use are eliminated.

One of the most important patented features is the plunger for locking the spindle when removing chucks and face plates; through keeping strains off the gears and shafts the use of this plunger preserves the accuracy of the head. Automatic force feed lubrication is furnished throughout. A feature of the new design is the mounting of the motor inside the leg, enhancing the appearance of the machine.

Machine Tool Builders Prove You Can't Afford to Use Obsolete Equipment

(*Concluded from Page 77*)

which gives equal wall thickness and perfect concentricity between bore and outside diameter. This machine is self-acting to an unusual degree, feeding itself from a hopper and checking and correcting itself through the medium of automatic gaging mechanism, thereby eliminating the inspection "bottleneck" in the flow of parts through the production line.

Mentioning the shortening of the work week, increase in all costs and a growing shortage of skilled labor as facts which the metalworking industry now actually is facing, W. D. Creider, general manager, Oilgear Co., Milwaukee, sees in new machine tools distinct relief from the rising tide of difficulties attending business recovery. "A great deal of thought," says Mr. Creider, "has been given in the past decade to development of machine tools which embody features for reducing dependence upon the human element for accuracy, finish and production, as well as the reduction of fatigue of the operator. These improvements make less serious the shortage of skilled labor, reduce possibilities of accidents to the operator, insure volume production, accuracy, finish, and reduce inspection and assembly costs."

Closely related to machine tools, so closely in fact that they have been accepted as members of the National Machine Tool Builders' association, are the builders of forging machinery. This forum would not be complete without a word from that related industry. The spokesman is Eugene C. Clarke, president, Chambersburg Engineering Co., Chambersburg, Pa. Mr. Clarke stresses the importance of good forging machinery as insurance that the preformed parts delivered to machine tools for the finer operations, shall themselves be uniformly exact in form. Mr. Clarke says, "In the past few years, particularly in the last three years, greater advance has been made in the refinement of drop forge production equipment than in the several preceding decades. In forgings, the reduction of allowance for finish, the closer tolerances on form and size, the better grain flow control, and the greater production at reduced costs, all due principally to advances in hammer design and construction, contribute to the more efficient performance in subsequent operations."

As an example of the advanced methods followed in research, Mr. Clarke mentions slow motion pictures of the forging operation, to determine what actually happens to the stock at the moment of impact. From knowledge so attained, entirely new cylinders and valve mechanism have been developed. These are so designed as to attain ideal conditions for plastic flow. This "controlled speed at impact" avoids blowing out of forgings, allows a marked reduction in the draft angle on the forging, which in turn permits the use of smaller stock and leaves less material to be removed for finishing.

W. E. Whipp, president, the Monarch Machine Tool Co., Sidney, O., well illustrates this new executive attitude when he says, "The most welcome visitor we have at our plant is the sales engineer who says, 'With your help and permission I would like to make an analysis of such and such manufacturing operations in your shop, to see whether or not our improved machines will save you money.' We give that representative all the help we can, and if he 'shows us,' he will likely get an order."

Returning to his primary character—which is that of a manufacturer of lathes, Mr. Whipp illustrates obsolescence in this effective manner. "Suppose we were about to buy a new automobile or an electric refrigerator and we called on a dealer who showed us a machine ten years old that had never been used, that had been sealed up in a glass case for the past ten years, that was a recognized leader in its line—the very finest thing produced—measured by all standards of ten years ago. Now just what would any of us pay for such a machine? We wouldn't pay anything for it—we simply wouldn't have it—it is wholly obsolete as measured by today's standards. Yet many of us who would refuse the gift of a new ten year old automobile or electric refrigerator, will refuse even to consider replacing obsolete machine tool equipment, the average age of which in most instances is much more than ten years."

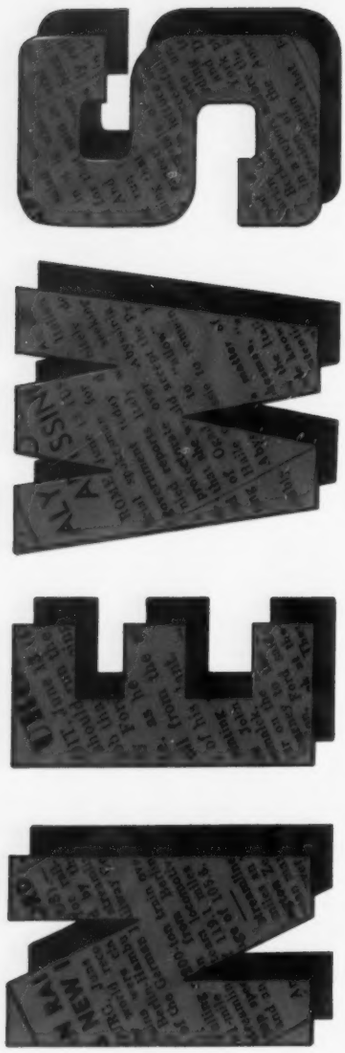
Hugo L. Olson, president and general manager, Sundstrand Machine Tool Co., Rockford, Ill., says: "Let any representative and progressive metalworking establishment refrain *long enough* from buying machine tools of the latest design, and that establishment first will cease to be progressive, next will cease even to be representative, and eventually will cease to exist. It is not so much a question of whether metalworking establishments can or cannot afford to buy machine tools of latest design, but rather a question of *how long they can refrain from buying.*"

In order to obtain information on which effectively to base the answer to the question, "To buy or not to buy?," Mr. Alson recommends the regular reading of the trade journals, both editorial matter and advertisements, the careful perusal of advertising matter sent out by machine tool builders and the visitation of machine tool plants, taking direct to the builders his difficult manufacturing problems. Admitting the extreme desirability but the practical difficulties of this last suggestion—at least under ordinary conditions—Mr. Olson points to the machine tool exposition in Cleveland as an unparalleled opportunity to carry out this ideal on a "mass-visitation" basis.

Present Claims Modestly

Throughout the preparation of this summary the writer has been impressed with the moderation shown by these leaders in the machine tool in their presentation of the results of some of the most significant years in the history of machine tool development. If ever they were in a position to "blow their horns" loudly it would be at this time. Knowing many of them personally, this is no great surprise. Machine tool builders generally are honest men and skilled technicians who are used to dealing with hard facts about the working of hard materials. They know that in the machine tool industry it does not pay in the long run to compromise either with truth or with accuracy. Otherwise they would not be in this basic and difficult business.

Like the machine tool industry as a whole, the machine tool show—which will be an embodiment of the whole industry under one roof—will be the lengthened shadow of the machine tool men who have made it a reality.



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See the
Landis
Exhibit

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Booths
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in the
Arcade

LANDIS
Will Exhibit 10 Machines In Action • • • • • •

Yes, sir! When you attend the Machine Tool Show you will see ten cost reducing, product improving grinders in action at the Landis booths. All of them are recent developments. Several have not been shown or even announced before.

The following machines will be included in the exhibit:

5" Hydraulic External Race Grinder
3½" Hydraulic Internal Race Grinder
6" x 18" Type C Plain Hydraulic Grinder
16" x 42" Type D Hydraulic Crank Pin Grinder
10" x 36" Type C Semi-Automatic Hydraulic Grinder
14" x 36" Type C Hydraulic Universal Grinder
15" x 8" Type C Hydraulic Internal Grinder
14" x 48" Type D Plain Hydraulic Grinder
12" x 32" Tool and Cutter Grinder
5" x 40" Hydraulic Cam Grinder

After you have seen this array of Landis grinders you will be convinced that there is ample opportunity for the reduction of costs and improving of quality in *your* grinding department. By all means attend the Show and, while there, don't miss the Landis exhibit.

202

LANDIS TOOL CO.

Waynesboro, Penna.

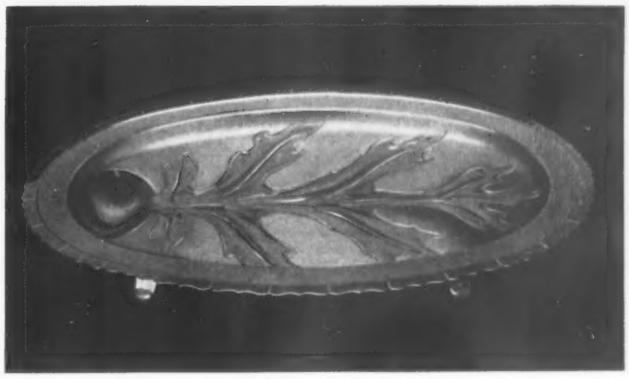
● Eighteen-inch chrome-plated steak platter or tray manufactured from cold rolled Acme Superstrip No. 3 finish. Superstrip, rolled for this job, allows perfect forming, and the flawless finish provides beauty that creates sales.

ACME SUPERSTRIP IS MAKING BETTER LOOKING PRODUCTS and BETTER SALES

● Good looks, plus good quality, get the consumer's favor. Scores of manufacturers are making better looking products with Acme Superstrip.

Two reasons make this possible: 1. Acme actually studies the product and rolls a strip that fits perfectly the needs of that product. 2. Acme has the skill, the equipment, and the will to produce steel of flawless finish.

As a result, Acme Superstrip has been chosen for the production of many consumer products that have proved outstandingly popular and successful.



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DON'T MISS

The September Issue of
MACHINE DESIGN
Featuring Machine Tools

Design

A unitized Machine Tool—A hydraulic broach—Mechanisms, finishes, parts, materials in these machines.

Mechanisms

Some of the most interesting devices are used in Machine Tools—Their application is practically universal.

Parts

Bearings, motors, controls, etc., especially as used in Machine Tools—Described in detail.

Historical

Developments in design of Machine Tools—A record of progress in a progressive field.

Materials

The range in Machine Tools is wide—Reasons for selection will aid all designers.

Predictions

What's ahead for Machine Tools and other machinery—Probable future development.

Processes

Welding of Machine Tool Frames—Analyzed by an expert in designing for welding.

Comments

Chief engineers will give their views—The effect of Machine Tool design on other machines, etc.

MACHINE DESIGN · PENTON BUILDING · CLEVELAND

NEW EQUIPMENT

A LARGE number of the machine tools and allied equipment to be introduced for the first time at the National Machine Tool exposition, Sept. 11-21, are described in a special section beginning on Page 89 of this issue. More developments will be presented in the Sept. 9 issue of STEEL.

Electric Drill—

Albertson & Co. Inc., Sioux City, Ia., recently brought out a new ½-inch electric drill with a no load speed of 525 and a load speed of 275 revolutions per minute. Gear case and armature ball bearings are

Sioux ½-inch electric drill is well-balanced unit for general shop work

permanently oil packed and sealed. The body of the unit, shown herewith, is die cast aluminum and the gears are heat treated alloy steel. The balanced power of this new drill distributes the load evenly. Other features include a double pole momentary switch with locking device for continuous operation, ½-inch 3-jaw chuck and key, and large universal motor for alternating or direct-current operation.

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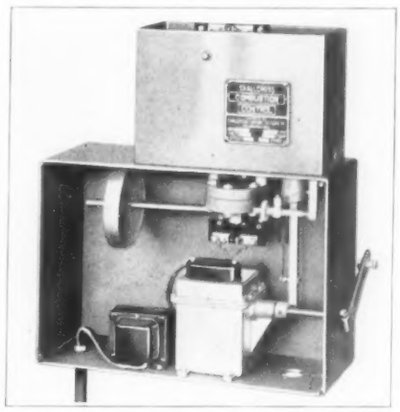
Combustion Control—

Shallcross Controls Inc., 3707 North Richards street, Milwaukee, recently introduced a type MC combustion control for steam boilers. The unit with covers removed is shown herewith. It maintains a uniform steam pressure and a correct flow of air for all rates of fuel supply. Adaptable to any kind of fuel, coal, oil or gas, the control is applicable to any type of stoker and is adaptable to any make, type or size of boiler as well as to any number of boilers in a battery. Pressures from 25 to 400 pounds can be controlled.

Operation is completely electrical. A steam pressure element, sensitive to pressure changes of less than one per cent of normal, actuates a motor driving a crank of sheave connected to the speed control member of a stoker or to the fuel valve of gas or oil burners. As the load varies the fuel is re-adjusted to meet the new load conditions, maintaining at all times the necessary steam pressure. While the fuel feed is being



Shallcross type MC combustion control for steam boilers

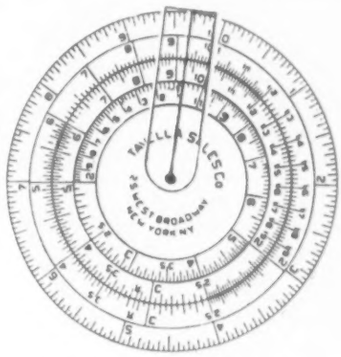
adjusted to maintain the proper steam pressure, the air supply also is maintained in proper ratio to the fuel.

• • •

Vest Pocket Slide Rule—

Tavella Sales Co., 25 West Broadway, New York, is marketing a vest pocket slide rule, shown herewith, that is grease and waterproof. By an improved process of graduating black lines on white celluloid, the company claims that it has been able to make a slide rule which is accurate and one which will retain that accuracy indefinitely. According to tests the average accuracy of the slide rule is making rapid calculations is within one-quarter of one per cent.

The instrument fits any vest pocket like a watch and weighs less than one ounce. Scales are on a disk 2¾



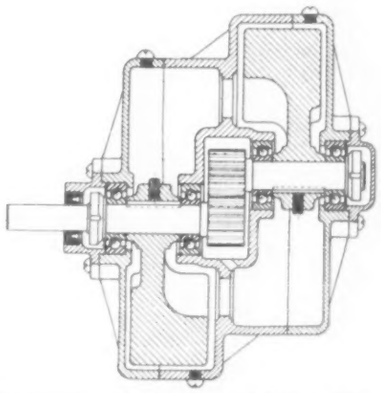
Vest pocket slide rule marketed by Tavella Sales Co.

inches in diameter and length of multiplication-division scale is 6.3 inches. Front side of the slide rule has four scales, log C, D and CI or C inverted scale. The reverse side has sine and tangent scales and an A and D scale for finding squares and square roots.

• • •

Mechanical Shaking Device—

Ajax Flexible Coupling Co., Westfield, N. Y., is offering a mechanical device for imparting a horizontal shaking or screening motion to a sieve, conveyor or other unit requiring such motion. Mechanically, the new device, shown herewith, consists of two weights geared together so



Dust-proof mechanical shaker introduced by Ajax Flexible Coupling Co.

that when one is driven both rotate at the same speed but in opposite directions. Weight members are segmental in form and are protected from dust in an oil-proof case. Two or more of these units may be operated in parallel.

• • •

Bar Type Floor Stands—

Andrew C. Campbell Division of American Chain Co. Inc., Bridgeport, Conn., is announcing bar type floor stands for its models 202 and 203 wet abrasive cut-off machine. The development, shown herewith, has a self-adjusting feature which saves time in handling stock. One set for the proper height, any shape or size of stock which the machine will handle is supported at the correct height for the machine without adjustment. Although designed for use with the company's abrasive cut-off machines, these stands can be employed to advantage in many other instances where bar stock or tubing must be supported.

Campbell bar type floor stand has self-adjusting feature which saves time in handling stock

• • •

Annunciator Units—

Kellogg Switchboard & Supply Co., 1066 West Adams street, Chicago, is marketing annunciators that detect abnormal conditions of plant operation quicker than the human eye or ear. These units are invaluable for the supervision of automatically operated machines or for those that under normal conditions require little supervision. For example, annunciator units have been adapted to show changes in pressure, liquid levels, speed, voltage, amperage, temperature, movement of bodies, vibration, flow and practically any other condition which should receive prompt attention at the first sign of abnormal operation.

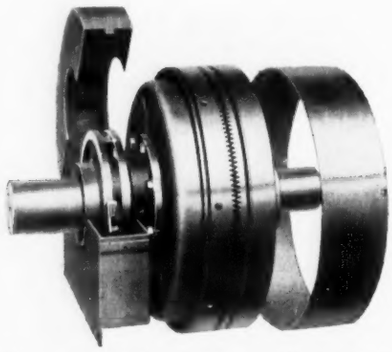
In designing these units practically any desired operation of indicating lights may be obtained, such as a lighted condition for normal operation, a dark indication for abnormal operation, or vice versa. Two or more lights may be assigned to indicate two or more conditions and a third light to indicate change from one condition to another. Various circuit arrangements may be worked out to best fill individual requirements.

This equipment is particularly useful as a check on heat conditions within the plant, which might cause fire or be otherwise injurious to property or product. The units may be self-contained as shown at right, or designed to fit into existing gage or control boards.

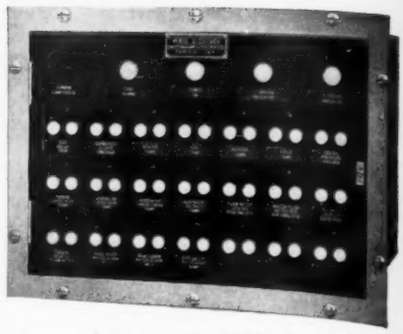
• • •

Magnetic Clutch Coupling—

Dings Magnetic Separator Co., Milwaukee, is announcing a new magnetic clutch coupling that insures positive quick engagement and disengagement with less than 1½ degrees of slip. The type SCC clutch, shown herewith, transmits high torque and has been applied on hot and cold strip mill secondary screwdown shafts, soaking pit covers and similar applications where positive engagement and remote control is necessary or desirable.



Dings magnetic clutch coupling transmits unusually high torque



Annunciator unit built by Kellogg Switchboard & Supply Co.

Internal coil springs disengage the clutch. Bronze teeth engage steel teeth in the outer periphery. Lag, due to residual magnetism, is overcome. The cover plate prevents dust and dirt from lodging on the engaging teeth. Engagement is so rapid that "racking" is said to be impossible. A 12-inch diameter clutch of the new type will yield more than 1500 foot pounds torque.

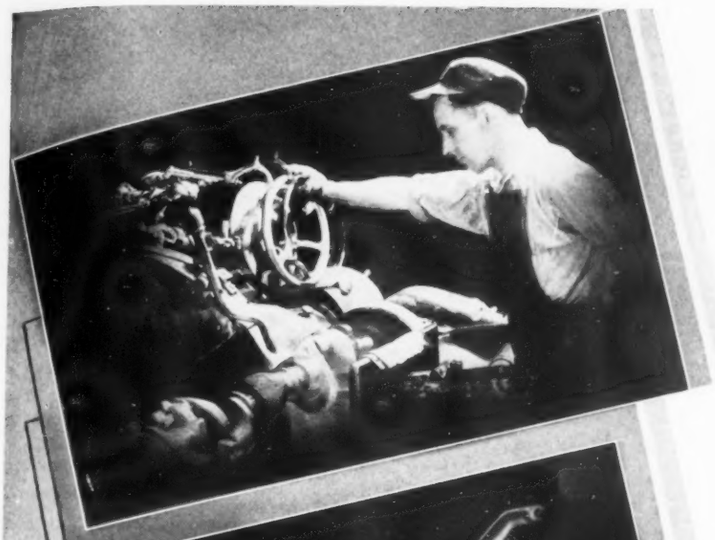
• • •

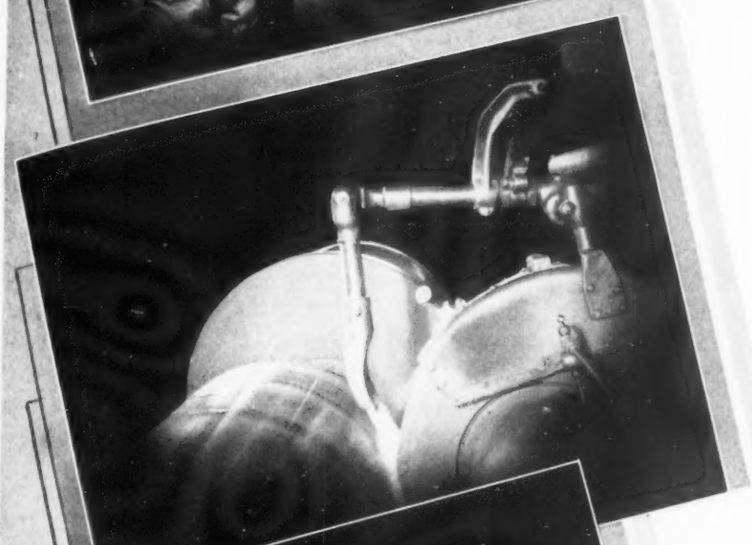
Automatic Gas Shutoff—

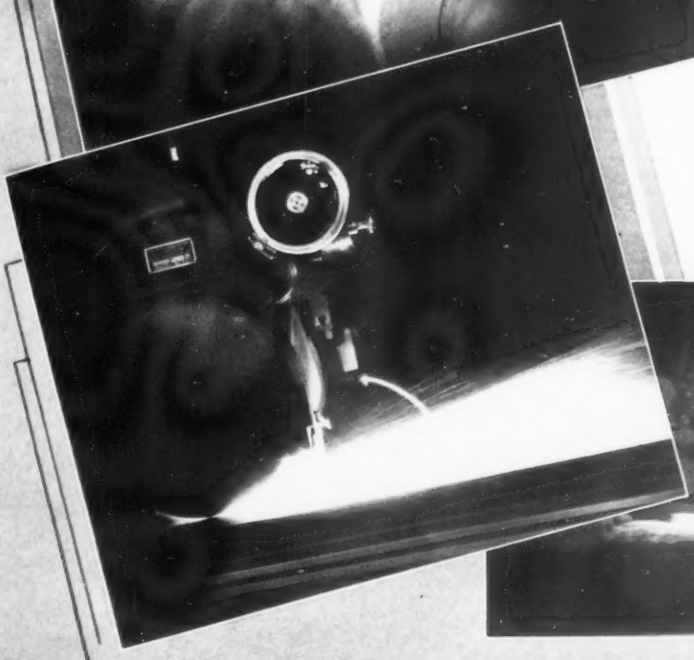
Bastian-Blessing Co., 240-258 East Ontario street, Chicago, recently brought out a device, illustrated below, which answers a definite industrial need for an economical, safe automatic gas shutoff where welding operations are performed intermittently throughout the day. Improvements include a lever arm assembly that automaticaly keeps the plunger mechanism in adjustment. In place of the adjusting screws formerly used there is a rocker attached to the top of the lever that adjusts itself automatically. A combination hook and automatic shutoff stops the supply of both gases when the torch is hung on the hook during the assembly operation and immediately lights the torch as it is lifted off the hook.

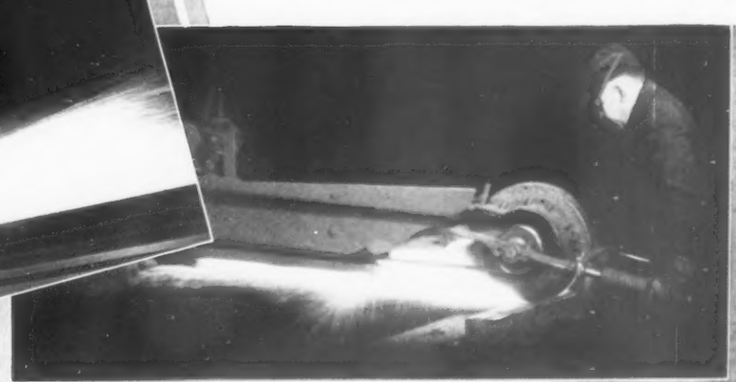
No gas is consumed while the operator is setting up work, and no gas

This RegO economizer meets a definite industrial need for an economical, leak-proof and safe automatic gas shutoff device where welding operations are performed intermittently through the day









REGARDLESS

—of what your grinding operation may be, there is a Macklin Wheel that will do the job

EASILY—

EFFICIENTLY—

ECONOMICALLY.

MACKLIN COMPANY

Manufacturers of GRINDING WHEELS

Jackson, Michigan, U. S. A.

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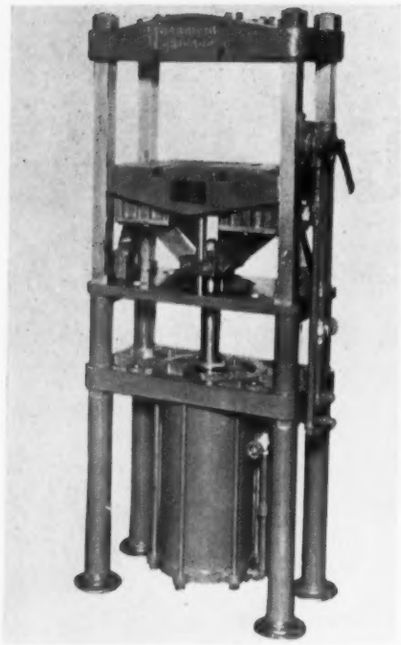


Hannifin air-operated press for plastic and rubber molding

is wasted due to flame readjustments, since flame control remains constant as set originally. The new RegO economizer, as it is known, is suitable for installation on either medium pressure or low pressure systems where fuel is piped at very low pressure.

♦ ♦ ♦

Air-Operated Molding Press—

Hannifin Mfg. Co., 621-31 South Kolmar avenue, Chicago, is introducing a compact 15-18-ton capacity air-operated platen press for plastic and rubber molding operations. The design of this rapid production unit provides an advance stroke at six times the speed of the pressing stroke. The advance stroke is 5½ inches at 6,000 pounds pressure and the pressing stroke 1½ inches at 30,000 pounds.

This new press, shown above, is being used for both hot and cold molding, rubber molding, and several types of special molding operations.

An especially valuable feature of this press in plastic molding work is the provision for the use of maximum pressure to "break" or separate the molds on the reverse stroke after the pressing operation is completed. An air cushion at the end of the stroke prevents shock. Since the press is air operated it is compact and comparatively light in weight. Use of the ordinary shop air supply makes it unnecessary to install hydraulic pumps or special hydraulic power supply for molding work.

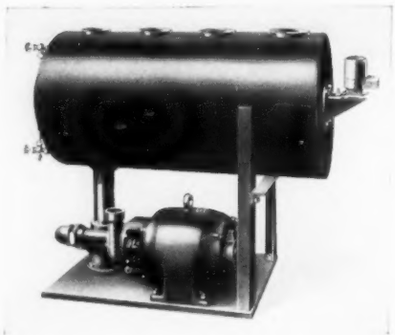
Dimensions of the platen are 17 x 14 inches, and capacity ranges from 15 tons with air line pressure of 80 pounds to 18 tons at 100 pounds per square inch. The same type of press inverted is available for bench mounting.

♦ ♦ ♦

Condensate Return Units—

Worthington Pump & Machinery Corp., Harrison, N. J., is marketing a complete series of 54 sizes and types of automatic condensate return units which are applicable to a wide variety of services. Ratings range from 2000 to 40,000 square feet of direct C.I. radiation or equivalent.

Condensate flows by gravity into the storage tank, trips a float switch at a predetermined depth, and the motor is automatically started. When the tank is drawn down to a predetermined minimum level, the motor is automatically stopped. Pump capacities for the 54 sizes



Worthington automatic condensate return unit

range from 3 to 60 gallons per minute; storage tank capacities from 22 to 98 gallons; and discharge pressures vary from 10 to 40 pounds per square inch.

Each standard unit, shown herewith, includes a bronze-fitted centrifugal pump, single or multistage, with a 40 degree Cent. continuous-rated splash-proof motor; float switch; starter where required; piping; tank; and gage glass; all mounted on a steel base plate.

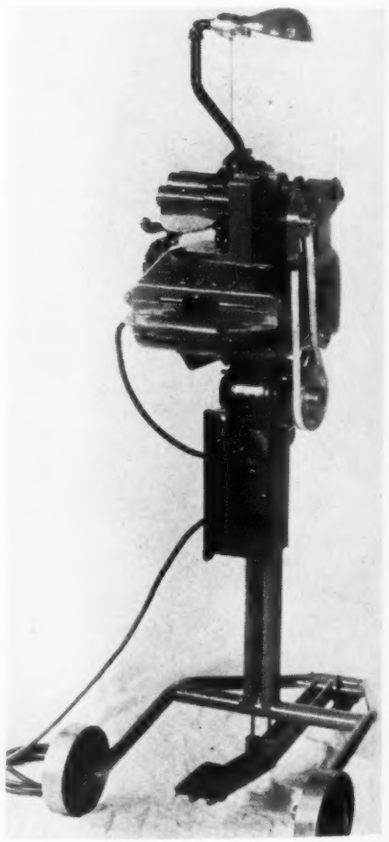
♦ ♦ ♦

Combination Welder And Trimmer—

Eisler Engineering Co., 762 South Thirteenth street, Newark, N. J., recently developed a combination cutting, welding and trimming machine upon which flexible cable may be cut apart or two pieces joined and trimmed without unraveling and at the same time maintain practically the same flexibility as it had before. This combination welder and trimmer, shown herewith, is designed to operate on either 110 or 220-volt alternating current and can be mounted on a bench or furnished with a movable pedestal permitting it to be readily moved from one position to another.

The machine is equipped with a special annealing device for annealing the welded stranded wire, a slide adjustment for closely regulating welding current, push button control of upset and current, foot-operated clamping jaws for holding the work, a lamp with reflector for adequate light upon the work and an especially designed grinder or trimmer for trimming the work. A flexible shaft or cable to be cut apart is clamped in the welding jaws. Application of the current welds the strands together and finally severs the cable. The ends of the cable are then placed in the trimmer which is equipped with a carborundum wheel driven by one-twentieth horsepower motor and finished off.

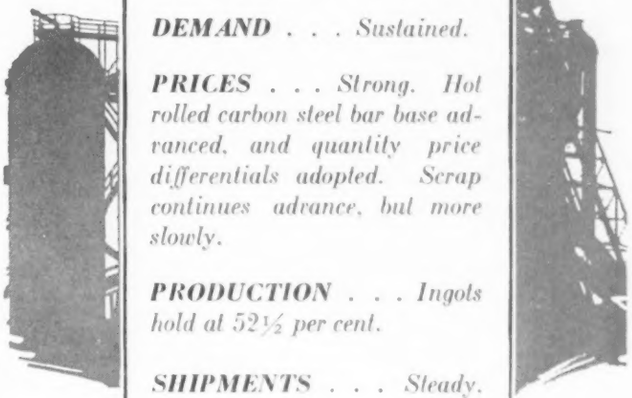
In welding two ends of cable together the ends are first prepared as above and then welded together after which it is placed in the annealer. After proper annealing, the cable is inserted in an automatic centering device of the trimmer and the burrs of the joint ground off. The machine will handle either square or round solid rods, wire and bars as well as flexible shafts and cables of steel, nickel, brass, copper and other metals up to 0.250-inch in diameter.



Eisler combination welder and trimmer for flexible shafts

Steel Rate Steady; Markets Still Strong

Renewed Demand Expected After Labor Day; Price Revisions Continue



MARKET IN TABLOID

DEMAND . . . *Sustained.*

PRICES . . . *Strong. Hot rolled carbon steel bar base advanced, and quantity price differentials adopted. Scrap continues advance, but more slowly.*

PRODUCTION . . . *Ingots hold at 52½ per cent.*

SHIPMENTS . . . *Steady.*

WITH generally strong market conditions prevailing, steelworks operations last week were unchanged at 52½ per cent. An easier tendency in the early part of the week was overcome when fresh commitments, mainly for the lighter steel products, lifted operations in some districts. A decline of 3 points to 57 per cent at Chicago was neutralized by an advance of 1 point to 44 at Pittsburgh; 5 to 56, Cleveland; 5 to 40½, Birmingham; 2 to 78, Wheeling; 2 to 62, Youngstown; while other districts retained recent gains.

Daily average steel ingot production made a striking recovery in August, after falling five consecutive months. Operations for the month averaged about 51 per cent, and preliminary estimates indicate output was up 23 per cent. Daily average pig iron output increased about 6 per cent, halting a two-month decline.

Temporary suspensions for Labor day again may affect steelworks activity early this week, but producers have looked forward to this day as a dividing line, beyond which they expect renewed demand for the fall manufacturing season. For one thing, they have substantial order backlogs from automobile manufacturers, against which early releases are anticipated.

Ford is expected to buy 60,000 to 70,000 tons of flat rolled steel about Sept. 10, in addition to its recent orders for 100,000 tons, not all of which have been specified. Manufacturers are giving up present models reluctantly, but must buy more material within a few weeks to get in production on the new series as scheduled. Automobile output last week was 49,000, down 1500, and the total for August was 220,000, lowest this year.

Structural shape fabricators were encouraged by the first inquiries, in Indiana, Michigan and New York, on the government's $4,000,000,000 public works program. From now on these projects are expected to spread to other states, and develop substantial steel tonnages within 30 days. Shape awards last week at 22,805 tons were almost double those of the preceding week.

The Mississippi Valley Barge Line, St. Louis, has awarded 30 steel barges to American Bridge Co., requiring 7500 tons of plates and shapes.

This week steelmakers expect to announce prices for fourth quarter on many products besides those recently adjusted. Some further revisions are anticipated.

Makers of hot rolled carbon steel bars have introduced quantity differentials, which in line with other recent revisions benefit large consumers, make small users pay more. The base has been advanced $1 a ton to $37, Pittsburgh, and the quantity base made 10 to 25 a ton. To users who buy more than this at one time the actual price will be $36 to $35 a ton. For tonnages less than base extras range from $1 to $20.

The result of this and similar revisions, producers believe, will be to lead consumers to anticipate requirements, eliminating heavy expense in dealing with small orders. Except bars and merchant wire products, there have been no other changes in base prices since July, 1934. Railroad axles have been advanced $3 a ton.

Since passage and approval of the Guffey coal bill, pig iron producers have virtually decided to advance prices after giving melters an opportunity to cover fourth quarter requirements. Pig iron prices also have been "frozen" since July last year, while scrap prices this year, as an average have advanced $1.96 a ton. STEEL's scrap composite last week rose 4 cents to $12.37.

Scrap exports declined sharply in July, while skelp increased, total iron and steel exports rising to 296,802 gross tons, 7115 tons more than in June. The Ethiopian crisis as well as strained relations between Russia and the United States, is felt in a tightening of available supplies of ferromanganese from abroad, and a stronger price situation.

STEEL's iron and steel price composite is up 6 cents to $32.78, while the finished steel index has advanced 10 cents to $54.10.

COMPOSITE MARKET AVERAGES

	Aug. 31	Aug. 24	Aug. 17	One Month Ago July, 1935	Three Months Ago May, 1935	One Year Ago Aug., 1934	Five Years Ago Aug., 1930
Iron and Steel	$32.78	$32.72	$32.68	$32.44	$32.35	$32.24	$32.90
Finished Steel	54.10	54.00	54.00	54.00	54.00	54.00	51.72
Steelworks Scrap	12.37	12.33	11.96	10.64	10.27	9.98	12.62

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Aug. 31, 1935	July, 1935	May, 1935	Aug., 1934
Steel bars, Pittsburgh	1.80c	1.80c	1.80c	1.80c
Steel bars, Chicago	1.85	1.85	1.85	1.85
Steel bars, Philadelphia	2.11	2.11	2.11	2.09
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.80
Shapes, Philadelphia	2.01½	2.01½	2.01½	2.00½
Shapes, Chicago	1.85	1.85	1.85	1.85
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80
Tank plates, Philadelphia	2.00	1.99	1.99	1.98½
Tank plates, Chicago	1.85	1.85	1.85	1.85
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.85
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.40
Sheets, No. 24, galvan., Pitts.	3.10	3.10	3.10	3.10
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.95
Sheets, No. 24, hot anneal., Gary	2.55	2.55	2.55	2.55
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.20
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pittsburgh	2.60	2.60	2.60	2.60

Semifinished Material

Sheets bars, open-hearth, Youngs.	$28.00	$28.00	$28.00	$28.00
Sheet bars, open-hearth, Pitts.	28.00	28.00	28.00	28.00
Billets, open-hearth, Pittsburgh	27.00	27.00	27.00	27.00
Wire rods, Pittsburgh	38.00	38.00	38.00	38.00

Pig Iron

	Aug. 31, 1935	July, 1935	May, 1935	Aug., 1934
Bessemer, del. Pittsburgh	$19.81	$19.81	$19.80	$19.76
Basic, Valley	18.00	18.00	18.00	18.00
Basic, eastern, del. eastern Pa.	19.76	19.81	19.81	19.76
No. 2 foundry, del. Pittsburgh	19.31	19.31	19.30	19.26
No. 2, foundry, Chicago	18.50	18.50	18.50	18.50
Southern No. 2, Birmingham	14.50	14.50	14.50	14.50
No. 2X eastern, del. Philadelphia	20.68	20.68	20.68	20.68
Malleable, Valley	18.50	18.50	18.50	18.50
Malleable, Chicago	18.50	18.50	18.50	18.50
Lake Superior charcoal, del. Chi.	24.25	24.25	24.25	24.04
Ferromanganese, del. Pittsburgh	90.13	90.13	90.13	89.79
Gray forge, del. Pittsburgh	18.67	18.67	18.66	18.58

Scrap

Heavy melting steel, Pittsburgh	$13.25	$12.30	$12.00	$11.45
Heavy melt. steel, No. 2, east. Pa.	11.00	9.55	9.25	8.45
Heavy melting steel, Chicago	12.75	10.40	10.20	9.25
Rails for rolling, Chicago	13.75	11.25	11.05	10.50
Railroad steel specialties, Chicago	13.75	12.00	11.40	10.25

Coke

Connellsville, furnace, ovens	$3.25	$3.30	$3.60	$3.60
Connellsville, foundry, ovens	4.00	4.25	4.60	4.60
Chicago, by-product foundry, del.	9.25	9.25	9.25	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week.

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.17c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.42c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.07c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c
Gary, No. 10	2.60c
Gary, No. 20	3.20c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base con. (box) Pitts.	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.07c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

Pittsburgh	1.80c
Chicago or Gary	1.85c
Duluth	1.95c
Birmingham	1.95c
Cleveland	1.85c
Buffalo	1.90c
Detroit, delivered	1.95c
Pacific ports, f.o.b. cars, dock	2.35c
Philadelphia, del.	2.11c
Boston, delivered	2.22c
New York, del.	2.15c
Pitts., forg. qual.	2.05c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	1.91c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.36c

Rail Steel

Straight lengths quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

(Prices apply to straight or mixed carloads; pool cars, or less, 15c up. 10% dis. on nail extras on stright or mixed carloads to one consignee.)

Base Pitts.-Cleve. 100 lb. keg.

Standard wire nails	$2.40
Cement coated nails	2.40
Galvanized nails, 15 gage and coarser	4.40
do. 16 gage and finer	4.90
Polished staples	3.10c
Galvanized fence staples	3.35c
Barbed wire, galv.	2.80c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$58.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs	1.95c
20,000 to 59,999 lbs.	1.90c
60,000 to 99,999 lbs.	1.85c
100,000 lbs. and over	1.82½c

Gary, Ind., Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.45c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo....0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni....1.05
5100 0.80-1.10 Cr....0.45
5100 Cr. spring....base
6100 bars....1.20
6100 spring....0.70
Cr., Ni., Van....1.50
Carbon Van....0.95
9250....Carbon base plus extras

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23⅞-in. Pittsburgh	1.85c
Chicago, base	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-rolled strip, Pitts., Cleve.	2.60c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts. 24-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$20.00
80-85 lbs.	$24.00
100 lbs.	$25.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll. qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.40c
Track bolts, base	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs. up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage Bolts

All sizes, cut thread....70-10-5 off
Rolled thread, ½ x 6, smaller....70-10-5 off

Machine Bolts

All sizes cut thread lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts stud bolts....70-10-5 off
Tire bolts....60-5 off
Stove bolts, 75 off in pkgs.; 83 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.
Rolled thread machine, ½ x 6, smaller....70-10-5 off
Step bolts....70-5 off
Elevator bolts....70-5 off

Nuts

S.A.E. semifinished hex.;
½ to ⅞-inch....70-10-5 off
Do., ½ to 1-inch....70-10-5 off
Do., over 1-inch....70 off

Hexagon Cap Screws

Milled....85-10 off
Upset, 1-in., smaller....87½ off

Square Head Set Screws

Upset, 1-in., smaller....80 off
Headless set screws....75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more no discount on size extras	$3.05
Do. under 5 kegs; no discount on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago del. 2½ points less. Wrought pipe, Pittsburgh.

Butt Weld

In.	Blk.	Gal.
Steel		
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel		
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel	
½, butt weld	57½
⅛-inch, butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists. 8—12-inch, no extra.

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots of 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935 card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east fdy.	43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B.

Stnd. fitgs., Birm. base	$100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$27.00
Philadelphia	32.67
Duluth	31.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chi., Buff.	35.00
Forging, Duluth	37.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	28.00

Slabs

Pitts., Cleve., Young.	27.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	38.00
Chicago	39.00
Worcester, Mass.	40.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.70c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.25-3.40
Connellsville, fdry.	4.00-4.10
Connel. prem. fdry.	5.00-5.10
New River fdry.	6.00
Wise county fdry.	4.45-5.00
Wise county fur.	4.00-4.50

By-Product Foundry

Newark, N. J., del.	9.20-9.65
Chi., ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	11.00
St. Louis, del.	9.25
Birmingham, ovens	6.00
Indianapolis, del.	8.75
Cincinnati, del.	9.00
Cleveland, del.	9.25
Buffalo, ovens	7.50-8.00
Detroit ov., out. del.	8.50
Philadelphia, del.	9.03

Coke By-Products

Per gallon, producers' plants.

	Tank lots	Spot
Pure and 90% benzol		15.00c
Toluol		30.00c
Solvent naphtha		30.00c
Commercial xylol		30.00c

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	4.50c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Birmingham, Ala., southern del.	14.50	14.50	13.50	19.00
Buffalo	18.50	19.00	17.50	19.50
Chicago	18.50	18.50	18.00	19.00
Cleveland	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
Duluth	19.00	19.00	.....	19.50
Erie, Pa.	18.50	19.00	18.00	19.50
Everett, Mass.	19.50	20.00	19.00	20.50
Hamilton, O.	18.50	18.50	18.00	19.00
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	18.50	18.50	18.00	19.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Sparrows Point, Md.	19.50	.....	19.00	.....
Swedeland, Pa.	19.50	20.00	19.00	20.50
Toledo, O.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
Delivered from Basing Points:				
Akron, O., from Cleveland	19.76	19.76	19.26	20.26
Baltimore from Birmingham	20.08	.....	18.96	.....
Boston from Birmingham	19.62	.....	19.50	.....
Boston from Everett, Mass.	20.00	20.50	19.50	21.00
Boston from Buffalo	20.00	20.50	19.50	21.00
Brooklyn, N. Y., from Bethlehem	21.93	22.43	.....	.....
Brooklyn, N. Y., from Bmghm.	21.55	.....	.....	.....
Canton, O., from Cleveland	19.76	19.76	19.26	20.26
Chicago from Birmingham	†18.72	.....	18.60	.....
Cincinnati from Hamilton, O.	19.51	19.51	19.01	.....
Cincinnati from Birmingham	19.38	.....	19.40	.....
Cleveland from Birmingham	19.04	.....	18.92	.....
Indianapolis from Hamilton, O.	20.93	20.93	20.43	21.43
Mansfield, O., from Toledo, O.	20.26	20.26	19.76	20.76
Milwaukee from Chicago	19.57	19.57	19.07	20.07
Muskegon, Mich., from Chicago, Toledo or Detroit	21.60	21.60	21.10	22.10
Newark, N. J., from Birmingham	20.61	.....	.....	.....
Newark, N. J., from Bethlehem	20.99	21.49	.....	.....
Philadelphia from Birmingham	19.93	.....	19.1	.....
Philadelphia from Swedeland, Pa.	20.31	20.81	19.81	.....
Pittsburgh district from Neville Island	Neville base plus 67c, 81c and $1.21 switching charges			
Saginaw, Mich., from Detroit	20.75	20.75	20.25	20.25

Delivered from Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	19.00	19.00	18.50	.....
St. Louis from Birmingham	†18.62	.....	18.50	.....
St. Paul from Duluth	20.94	20.94	.....	21.44

†Over 0.70 phos.

Low Phos

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $23.50. Phila. base, standard and copper bearing, $24.63.

Gray Forge		Charcoal	
Valley furnace	18.00	Lake Superior fur.	21.00
Pitts. dist. fur.	18.00	Do., del. Chicago	24.25
		Lyle, Tenn.	21.50

Silvery†

Jackson County, O., base; 6% $22.75; 7—$23.75; 8—$24.75; 9—$25.70; 10—$26.75; 11—$27.75. Buffalo base prices, up $1.25.

Bessemer Ferrosilicon†

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25. Buffalo base prices $1.25 higher.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon: 2 to 3%, $1 per ton additional; each unit over 3%, $1 per ton additional.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $55.00

First Quality.

Pa., Ill., Md., Mo. $45.00
Alabama, Ga., Ky., $40.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo. 40.00
Ga., Ala. 35.00

Ohio

First quality $40.00
Intermediary 37.00
Second quality 28.00

Malleable Bung Brick

All bases 50.00

Silica Brick

Pennsylvania $45.00
Joliet, E. Chicago 54.00
Birmingham, Ala. 52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags).... $45.00
Domestic dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags).. 40.00
Domestic dead-burned gr. net ton f.o.b. Chewelah, Wash. (bulk).. 22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick $45.00
Chemically bonded chrome brick 45.00
Magnesite brick 65.00
Chemically bonded magnesite brick 55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton $18.75-19.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads $14.50

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid 85.00
Do., Balti. base 85.00
Do., del. Pittsburgh 90.13
Spiegeleisen, 19-20% dom. Palmerton, Pa., spot† 26.00
Do., New Orleans 26.00
Ferrosilicon, 50% freight all., cl. 77.50
Do., less carload .. 85.00
Do., 75 per cent .. 126-130.00
Spot, $5 a ton higher.
Silicomang., 2½ carb. 90.00
2% carbon, 95.00; 1%, 105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del. .. 10.00
Ferrotungsten, stand., lb. cont. del. 1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont. 2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton 137.50
Spot, 1 ton, frt. allow., lb. 7.00
do., under 1 ton..... 7.50
Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $2 unitage 50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage 65.00
Ferromolybdenum, stand. 55-65%, lb. 0.95
Molybdate, lb. cont. 0.80
†Carloads, Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead: New York	Lead: East St. L.	Zinc: St. L.	Aluminum 99%	Antimony: Chinese Spot, N. Y.	Nickel: Cathodes
Aug. 24	8.50	8.62½	8.00	49.62½	48.75	4.35	4.20	4.60	*19.00	13.00	35.00
Aug. 26	8.50	8.62½	8.00	49.25	48.50	4.35	4.20	4.60	*19.00	13.00	35.00
Aug. 27	8.50	8.62½	8.00	49.12½	48.10	4.35	4.20	4.60	*19.00	13.00	35.00
Aug. 28	8.50	8.62½	8.00	49.25	48.45	4.35	4.20	4.60	*19.00	13.00	35.00
Aug. 29	8.50	8.62½	8.00	49.25	48.55	4.35	4.20	4.60	*19.00	13.00	35.00
Aug. 30	8.50	8.62½	8.00	49.12½	48.50	4.35	4.20	4.60	*19.00	13.00	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper.

Sheets

Yellow brass (high)	14.00
Copper, hot rolled..	15.50
Lead, cut to obbers	8.00
Zinc, 100-lb. base.....	9.50

Tubes

High yellow brass	15.75
Seamless copper	15.75

Rods

High yellow brass	12.50
Copper, hot rolled	12.75

Anodes

Copper untrimmed....	13.25

Wire

Yellow brass (high)	14.50

OLD METALS

Deal. buying prices, cents lb.

No. 1 Composition Red Brass

New York	5.00- 5.25
Cleveland	5.37½-5.62½
Chicago	5.12½-5.37½
St. Louis	5.25- 5.50

Heavy Copper and Wire

New York, No. 1....	6.50- 6.75
Chicago, No. 1	6.25- 6.50
Cleveland	5.75- 6.00
St. Louis, No. 1.....	6.50- 6.75

Light Copper

New York	5.25- 5.50
Chicago	4.62½-4.87½
Cleveland	5.00- 5.25
St. Louis	5.25- 5.50

Light Brass

Chicago	2.75- 3.00
Cleveland	2.62½-2.87½
St. Louis	2.75- 3.00

Lead

New York	3.25- 3.37½
Cleveland	3.15- 3.40
*Chicago	3.12½-3.37½
St. Louis	3.40- 3.50

Zinc

New York	2.00- 2.25
Cleveland	2.25- 2.50
St. Louis	2.65- 2.75

Aluminum

Borings, Cleveland	7.50- 8.00
Mixed, cast, Clev....	12.50-12.75
*Mixed, cast, St. L.	12.50-13.00
Clips, soft, Cleve.....	14.00-14.50

SECONDARY METALS

*Brass ingot, 85-5-5-5	8.50
*Stand. No. 12 alum.	16.75-17.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	8.50- 9.00
Boston, dock, expt.	8.75- 9.00
Boston, domestic	7.25- 7.50
Buffalo, No. 1	11.50-12.00
Buffalo, No. 2	10.00-10.50
Chicago, No. 1	12.50-13.00
Cleveland, No. 1	12.00-12.50
Cleveland, No. 2	11.00-11.50
Detroit, No. 1	9.50-10.00
Detroit, No. 2	8.50- 9.00
Eastern Pa., No. 1	12.00
Eastern Pa., No. 2	11.00
Federal, Ill.	8.75- 9.25
Granite City, R. R.	9.50- 10.00
Granite City, No. 2	7.75- 8.25
N. Y., deal, No. 2	7.50
N. Y., deal. barge	8.50
Pittsburgh, No. 1	14.00-14.50
Pittsburgh, No. 2	12.00-12.50
St. Louis	7.75- 8.25
Valleys, No. 1	13.00-14.00

COMPRESSED SHEETS

Buffalo, dealers	10.00-10.50
Chicago, factory	11.50 12.00
Chicago, dealer	10.25-10.75
Cleveland	11.00-11.50
Detroit	10.00-10.50
E. Pa., new mat.	10.00-10.50
Pittsburgh	13.00-13.50
St. Louis	6.25- 6.75
Valleys	12.50-13.00

BUNDLED SHEETS

Buffalo	7.25- 7.75
Cincinnati, del.	7.00- 7.50
Cleveland	9.50-10.00
Pittsburgh	12.00-12.50
St. Louis	4.50- 5.00

SHEET CLIPPINGS, LOOSE

Chicago	7.00- 7.50
Cincinnati	6.50- 7.00
Detroit	5.00- 5.50
St. Louis	4.75- 5.25

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	14.00-14.50
Chicago (3 ft.)	14.00-14.50
Chicago (2 ft.)	15.00-15.50
Cincinnati, del.	12.00-12.50
Detroit	11.50-12.00
Pitts., open-hearth, 3 ft. and less	15.00-15.50
St. Louis, 2 ft.&less	13.00-13.50

STEEL RAILS, SCRAP

Boston	7.50- 7.75
Chicago	12.50-13.00
Pittsburgh	14.00-14.50
St. Louis	11.25-11.75
Buffalo	14.00-14.50

STOVE PLATE

Birmingham	5.75- 6.00
Boston, dealers	3.50- 3.75
Buffalo	10.00-10.50
Buffalo	10.25-10.75
Cincinnati, dealers	6.50- 7.00
Detroit, net	6.50- 7.00
Eastern Pa.	9.25
N. Y., deal. fdry.	6.00
St. Louis	6.50- 7.00

COUPLERS, SPRINGS

Buffalo	13.25-13.75
Chicago, springs	13.50-14.00
Eastern Pa.	13.50
Pittsburgh	15.00-15.50
St. Louis	12.00-12.50

ANGLE BARS—STEEL

Chicago	14.00-14.50
St. Louis	10.50-11.00

RAILROAD SPECIALTIES

Chicago	13.50-14.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	13.25-13.75
Cleveland, billet, bloom crops	14.50-15.00
Eastern Pa., crops	14.50-15.00
Pittsburgh, billet, bloom crops	15.50-16.00
Pittsburgh, sheet bar crops	14.00-14.50

FROGS, SWITCHES

Chicago	12.50-13.00
St. Louis, cut	11.25-11.75

SHOVELING STEEL

Chicago	12.50-13.00
Federal, Ill.	9.00- 9.50
Granite City, Ill.	7.75- 8.25

RAILROAD WROUGHT

Birmingham	8.00- 8.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	10.00-10.50
Buffalo, No. 2	11.50-12.00
Chicago, No. 1, net	9.50-10.00
Chicago, No. 2	12.50-13.00
Cincinnati, No. 2	9.00- 9.50
Eastern Pa.	12.00
N. Y., No. 1, deal.	9.50-10.00
St. Louis, No. 1	6.50- 7.00
St. Louis, No. 2	9.25- 9.75

SPECIFICATION PIPE

Boston	3.00- 3.25
Eastern Pa.	9.00- 9.50
New York, dealers	3.50- 4.00

BUSHELING

Buffalo, No. 1	10.00-10.50
Chicago, No. 1	11.00-11.50
Cinci., No. 1, deal.	7.00- 7.50
Cincinnati, No. 2	4.00- 4.50
Cleveland, No. 2	7.75- 8.25
Detroit, No. 1, new	8.50- 9.00
Valleys, new, No. 1	12.25-12.75

MACHINE TURNINGS

Birmingham	3.50- 4.00
Boston, dealers	3.25- 3.50
Buffalo	5.25- 5.75
Chicago	6.50- 7.00
Cincinnati, dealers	5.00- 5.50
Cleveland	7.75- 8.25
Detroit	5.25- 5.75
Eastern Pa.	7.00- 7.50
New York, dealers	3.75- 4.00
Pittsburgh	9.00- 9.50
St. Louis	2.25- 2.75
Valleys	8.50- 9.00

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	2.50- 2.75
Buffalo	7.00- 7.50
Cincinnati, dealers	5.00- 5.50
Cleveland	7.75- 8.25
Detroit	6.00- 6.50
Eastern Pa.	5.00
New York, dealers	1.50- 1.75
Pittsburgh	7.00- 8.00

CAST IRON BORINGS

Birmingham, plain	3.50- 4.00
Boston, chemical	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	7.00- 7.50
Chicago	6.00- 6.50
Cincinnati, dealers	5.00- 5.50
Cleveland	7.75- 8.25
Detroit	6.00- 6.50
E. Pa., chemical	11.00-12.00
New York, dealers	1.50- 1.75
St. Louis	2.00- 2.50

PIPE AND FLUES

Cincinnati, dealers	5.50- 6.00

RAILROAD GRATE BARS

Buffalo	8.50- 9.00
Chicago, net	7.50- 8.00
Cincinnati	4.50- 5.00
Eastern Pa.	9.00
New York, dealers	4.00- 4.50
St. Louis	4.50- 5.00

FORGE FLASHINGS

Boston, dealers	5.75- 6.00
Buffalo	10.00-10.50
Cleveland	9.50-10.00
Detroit	8.00- 8.50
Pittsburgh	11.00-11.50

FORGE SCRAP

Boston, dealers	4.50
Chicago, heavy	13.00-13.50
Eastern Pa.	11.50-12.00

ARCH BARS, TRANSOMS

St. Louis	10.00-10.50

AXLE TURNINGS

Boston, dealers	3.00- 3.50
Buffalo	10.50-11.00
Chicago, elec. fur.	12.00-12.50
Cleveland	7.00- 7.50
Eastern Pa.	9.50
St. Louis	7.00- 7.50

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point.	10.00-10.50
Buffalo	13.25-13.75
Chicago, net	14.25-14.75
Eastern Pa.	16.00
St. Louis	12.00-12.50

SHAFTING

Boston, ship. point.	12.50-12.75
Eastern Pa.	17.50
New York, dealers	13.25-13.50
St. Louis	11.00-11.50

CAR WHEELS

Birmingham	9.00-10.00
Boston, iron deal.	6.00- 6.25
Buffalo, iron	11.00-11.50
Buffalo, steel	13.25-13.75
Chicago, iron	12.50-13.00
Chicago, rolled steel	13.50-14.00
Cincinnati, iron	9.50-10.00
Eastern Pa., iron	12.00
Eastern Pa., steel	13.50
Pittsburgh, iron	13.00-13.50
Pittsburgh, steel	15.00-15.50
St. Louis, iron	9.75-10.25
St. Louis, steel	12.00-12.50

NO. 1 CAST SCRAP

Birmingham	8.50- 9.50
Boston, No. 1 mach.	8.50- 9.00
Boston, No. 2	7.50- 8.00
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	11.75-12.25
Buffalo, mach.	12.50-13.00
Chicago, agri. net	9.50-10.00
Chicago, auto	10.50-11.00
Chicago, mach. net	11.00-11.50
Chicago, railr'd net	10.50-11.00
Cinci., mach. cup	9.50-10.00
Cleveland, cupola	12.25-12.75
Detroit, net	10.00-10.50
Eastern Pa., cupola	12.00
E. Pa., mixed yard	10.50
Pittsburgh, cupola	14.00-14.50
San Francisco, del.	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	9.50-10.00
St. L., No. 1 mach.	10.00-10.50

HEAVY CAST

Boston, del.	5.50- 5.75
Buffalo, break.	10.00-10.50
Cleveland, break.	10.00
Detroit, No. 1, mach. net	10.50-11.00
Detroit, break.	8.50- 9.00
Detroit, auto net	10.75-11.25
Eastern Pa.	11.00-11.50
N. Y., break. deal.	6.75- 7.25
Pittsburgh	12.50-13.00

MALLEABLE

Birmingham, R. R.	10.50-11.00
Boston, consum.	12.00-12.50
Buffalo	13.25-13.75
Chicago, R. R.	14.50-15.00
Cincinnati, agri. del.	9.50-10.00
Cleveland, rail	14.50-15.00
Detroit, auto	11.50-12.00
St. Louis, R. R.	12.00-12.50
Eastern Pa., R. R.	11.00-11.50

RAILS FOR ROLLING

5 feet and over

Birmingham	10.50-11.00
Boston, dealers	8.00- 8.50
Buffalo	11.00-11.50
Chicago	13.50-14.00
Eastern Pa.	12.50-13.00
New York, dealer	10.50-11.00
St. Louis	12.00-12.50

LOCOMOTIVE TIRES

Chicago (cut)	13.50-14.00
St. Louis, No. 1	10.00-10.50

LOW PHOS. PUNCHINGS

Buffalo	12.75-13.25
Chicago	14.50-15.00
Eastern Pa.	13.00-14.00
Pittsburgh (heavy)	15.00-15.50
Pittsburgh (light)	14.00-14.50

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ores

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. low phos.	10.00-10.50
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish No. Africa basic, 50 to 60%	9.50
Tungsten, spot sh. ton unit, duty pd.	$15.50-16.00
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00-19.00

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots.

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	
Baltimore*	2.95c
Boston††	3.00c
Buffalo	3.00c
Chattanooga	3.31c
Chicago	2.95c
Cincinnati	3.17c
Cleveland	2.95c
Detroit	3.04c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.06c
New Orleans	3.30c
New York‡(d)	3.26c
Pittsburgh (h)	2.90c
Philadelphia*	2.93c
San Francisco	3.60c
Seattle	3.60c
St. Louis	3.20c
St. Paul	3.00c
Tulsa	3.25c
IRON BARS	
Portland	3.40c
Chattanooga	3.31c
Baltimore*	3.05c
Chicago	2.75c
Cincinnati	3.17c
New York‡(d)	3.36c
Philadelphia*	2.93c
St. Louis	3.20c
Tulsa	3.25c
REINFORCING BARS	
Buffalo	2.60c
Chattanooga	3.31c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.25c
Tulsa	3.25c
Young.	2.30c-2.60c
SHAPES	
Baltimore*	3.00c
Boston††	3.19c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland	3.31c
Detroit	3.42c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.37c
Philadelphia*	2.98c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.45c
St. Paul	3.25c
Tulsa	3.50c
PLATES	
Baltimore*	3.00c
Boston††	3.21c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland, ¼-in. and over	3.31c
Detroit	3.42c
Detroit, ⅜-in.	3.65 c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York(d)	3.40c
Philadelphia*	2.98c
Phila. floor	4.95c
Pittsburgh(h)	3.15c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.45c
St. Paul	3.25c
Tulsa	3.50c
NO. 10 BLUE	
Baltimore*	3.10c
Boston††	3.30c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.22c
Cleveland	3.11c
Det., 8-10 ga.	3.14c
Houston	3.35c
Los Angeles	3.70c
Milwaukee	3.16c
New Orleans	3.55c
New York	3.31c
Portland	3.75c
Philadelphia*	3.08c
Pittsburgh(h)	2.95c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.70c
NO. 24 BLACK	
Baltimore*†	3.60c
Boston (g)	3.95c
Buffalo	3.25c
Chattanooga	4.21c
Chicago	3.85c
Cincinnati	4 07c
Cleveland	3.91c
Detroit	3.94c
Los Angeles	4.35c
Milwaukee	3.96c
New York	3.89c
Philadelphia*†	3.60c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis	4.10c
St. Paul	3.695c
Tulsa	4.75c
NO. 24 GALV. SHEETS	
Baltimore*†	4.30c
Buffalo	4.00c
Boston (g)	4.65c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.72c
Cleveland	4.61c
Detroit	4.72c
Houston	4.40c
Los Angeles	4.95c
Milwaukee	4.66c
New Orleans	4.50c
New York	4.50c
Philadelphia*†	4.30c
Pitts** (h)	4.15-4.45c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis	4.65c
St. Paul	4.19c
Tulsa	5.10c
BANDS	
Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.47c
Cleveland	3.36c
Detroit, ⅜-in. and lighter	3.39c
Houston	3.25c
Los Angeles	4.10c
Milwaukee	3.41c
New Orleans	3.95c
New York(d)	3.56c
Philadelphia	3 18c
Pittsburgh (h)	3.20c
Portland	4.25c
San Francisco	4.25c
Seattle	4.25c
St. Louis	3.55c
St. Paul	3.20c
Tulsa	3.45c
HOOPS	
Baltimore	2.30c
Boston	4.30c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.47c
Det., No. 14 and lighter	3.39c
Los Angeles	5.85c
Milwaukee	3.41c
New York	3.56c
Philadelphia	3.43c
Pittsburgh(h)	3.70c
Portland	5.60c
San Francisco	6.15c
Seattle	5.60c
St. Louis	3.55c
St. Paul	3.75c
COLD FIN. STEEL	
Baltimore (c)	3.58c
Boston	3.75c-3.90c
Buffalo (h)	3.40c
Chattanooga*	3.98c
Chicago (h)	3.35c
Cincinnati	3.57c
Cleveland (h)	3.35c
Detroit	3.49c
Los Ang.(f) (d)	5.85c
Milwaukee	3.46c
New Orleans	4.15c
New York	3.81c-4.31c
Philadelphia	3.61c
Pittsburgh	3.20c
Portland (f) (d)	6.00c
San Fran.(f) (d)	5.95c
Seattle (f) (d)	6.00c
St. Louis	3.60c
St. Paul	3.05c
Tulsa	4.50c
COLD ROLLED STRIP	
Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.44c
Cleveland (b)	3.20c
Detroit	3.33c
New York	3.36c
St. Louis	3.45c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	70
Cleveland	70
Detroit	70–5
Milwaukee	70
Pittsburgh	70

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Minus quant. diff.; (e) New mill classif.; (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less.

‡Domestic bars; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; †New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, August 29

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15 56 3 2 6	$13 99	1 15 0
Basic bessemer	15 56 3 2 6*	12 91	1 12 0
Hematite, Phos. .03-.05	16 31 3 5 6	.....	.....
SEMIFINISHED STEEL			
Billets	$27 39 5 10 0	$18 98	2 7 0
Wire rods, No. 5 gage	42 33 8 10 0	36 38	4 10 0
FINISHED STEEL			
Standard rails	$38 60 7 15 0	$36 34	5 10 0
Merchant bars	1.67c 7 10 0	1.14c to 1.19c	3 2 6 to 3 5 0
Structural shapes	1.64c 7 7 6	1.12c	3 1 6
Plates, †¾ in. or 5 mm.	1.78c 8 0 0	1.54c	4 5 0
Sheets, black, 24 gage or 0.5 mm.	2.05c 9 5 0	2.12c	5 16 0††
Sheets, gal., 24 gage, corr.	2.50c 11 5 0	3.19c	8 15 0
Bands and strips	1.89c 8 10 0	1.45c	4 0 0
Plain wire, base	2.50c 9 5 0	1.85c	5 7 6
Galvanized wire, base	2.39c 10 15 0	2.28c to 2.32c	6 5 6 to 6 7 6
Wire nails, base	2.66c 12 0 0	2.10c	5 15 0
Tin plate, box 108 lbs.	$4 48 0 18 2	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d	French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$16 81 5 7 6(a)	$17 24	260	$12 51	370	$25 38 63
Basic bessemer pig iron	17 43 5 10 0(a)*	12 60	190	11 15	330	28 00 (b) 69 50
Furnace coke	4 11 0 16 6	6 30	95	3 89	115	7 66 19
Billets	27 39 5 10 0	28 51	430	18 25	540	38 88 96 50
Standard rails	1.85c 8 5 0	2.08c	694	1.65c	1,100	2.42c 132
Merchant bars	1.91c 8 12 0	1.68c	560	90c	600	2.01c 110
Structural shapes	1.94c 8 15 0	1.65c	550	90c	600	1.97c 107 50
Plates, †¼-in. or 5 mm.	2.01c 9 1 3	2.10c	700	1.05c	700	2.32c 127
Sheets, black	2.44c 11 0 0§	1.86c	620‡	1.24c	825‡	2.64c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	2.89c 13 0 0	3.45c	1,150	2.25c	1,500	6.77c 370
Plain wire	2.05c 9 5 0	3.39c	1,130	1.75c	1,150	3.17c 173
Bands and strips	2.08c 9 7 0	1.95c	650	1.26c	840	2.32c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel a del. Middlesbrough. b hematite. ††Close annealed

**Gold pound sterling carries a premium of 64.70 per cent over paper sterling.

Bars

Bar Prices, Page 140

CARNEGIE STEEL CO., Pittsburgh, announces a second step in revising prices and extras for hot-rolled carbon steel bars to become effective Sept. 3 on fourth quarter business. Sales of this product for fourth quarter will be on the basis of 1.85c per pound, base, Pittsburgh, subject to the usual list of extras, except that an innovation is established in the schedule of extras for quantity. The new feature involves certain deductions to give buyers the benefit of savings effected when sufficient tonnage is ordered to permit economical mill operations and is the result of several years' study of costs as related to quantities produced. Some minor revisions in extras which have been in effect for many years for small quantities are also included. The new schedule of deductions and extras is as follows and applies to quantities of a size of one grade or analysis ordered for shipment to one destination at one time:

"The following quantity extras and deductions are to be added to, or deducted from, the net price of material. These extras and deductions are to be determined by the total weight of the size ordered of one grade or analysis released for shipment to one destination at one time. Quantities are shown in net tons unless otherwise noted. On quantities up to 10 tons, shipment of 10 per cent over or under, and on quantities 10 tons and over, shipment of 5 per cent over or under is permissible:

Cents Per 100 Pounds

Quantities	Deduction
100 tons and over	10
Under 100 to 50 tons	7½
Under 50 to 25 tons	5
Under 25 to 10 tons	Base
	Extra
Under 10 to 5 tons	5
Under 5 to 3 tons	7½
Under 3 to 2 tons	10
Under 2 to 1 ton	20
Under 1 ton to 1000 lbs.	50
Under 1000 lbs.	$1

Pittsburgh—Most important event in the steel bar trade is the announcement by Carnegie Steel Co. of revision in prices and extras for hot-rolled carbon steel bars to be effective Sept. 3 on fourth quarter business. The new bar base for the final quarter of the year is announced at 1.85c per pound base, Pittsburgh, subject to the usual list of extras except that a new feature is the establishment of a schedule of extras for quantity. Automotive needs call for increased shipments of bars and to this is being added gradually improving demand from miscellaneous

THE ENGINEERING ACHIEVEMENT
IN OIL SEAL DESIGN

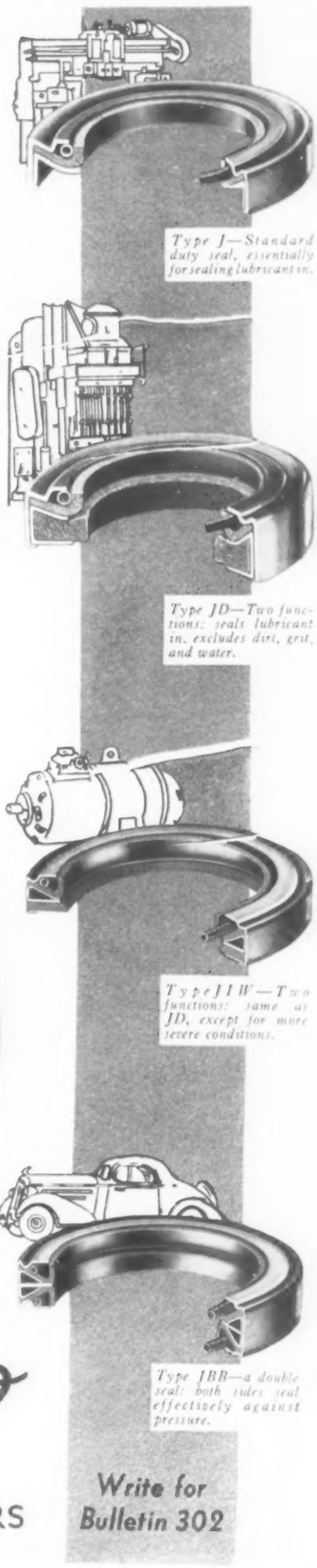
A machine tool is only as efficient as the seals which protect its bearings. Milpaco Oil Seals, engineered and designed for every type of machine tool application, provide the most efficient and economical seal obtainable.

Milpaco Oil Seals are efficient and economical because scientific methods are used in producing them. Technically trained mechanical and chemical engineers with a complete knowledge of the subject, design, test, and control the physical and chemical processing of them. Years of intensive research in the field and in the laboratory make it possible to provide a Milpaco Oil Seal for every kind and type of service application.

A consulting engineering service on oil seals for all kinds of application is available. More than twenty-five years of research and experience have provided a vast storehouse of interesting facts and information on this subject. You are invited to consult our engineers and to investigate Milpaco Oil Seals.

MICHIGAN LEATHER PACKING CO.
720 Fourteenth Avenue DETROIT
Represented in Principal Cities

5-106



Type J—Standard duty seal, essentially for sealing lubricant in.

Type JD—Two functions: seals lubricant in, excludes dirt, grit, and water.

Type JIW—Two functions: same as JD, except for more severe conditions.

Type JBB—a double seal: both sides seal effectively against pressure.

Milpaco

OIL SEALS & GREASE RETAINERS

Write for Bulletin 302

sources. Alloy steel bar shipments for August are running about 15 per cent ahead of July.

Cleveland—Specifications for steel bars increased moderately during the week. The Cleveland bar producer lighted another open hearth to operate nine of its 14 units. A much heavier demand for bars, as well as sheets, manufactured by an associated interest, is expected early this month. Automobile forging shops have placed fairly large orders, and miscellaneous demand is holding up.

Boston — Alloy steel bars are slightly more active in small lots, machine tool builders buying more freely. Commercial steel and forging bars are steady with little change in volume. Small tool shops are buying sparingly.

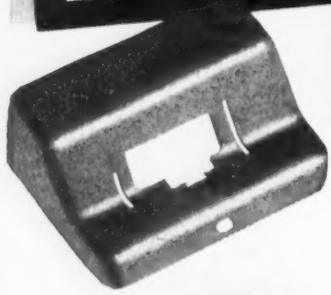
Chicago — Steel bar specifications are holding at recently improved levels and generally are for prompt shipment. Automotive shipments, while in fair volume, are expected to be heavier after the industry has started new model production. There is little in prospect to interrupt current active schedules of the farm implement industry, while miscellaneous consumers still account for a large share of total deliveries. Warehouses are taking fairly heavy bar shipments. Deliveries on current contracts are to be completed by Sept. 30.

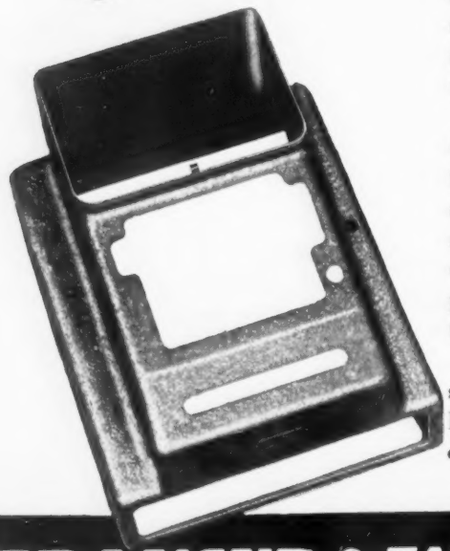
New York—The movement of steel bars in this district reflects better buying by jobbers, although requirements of some leading manufacturing consumers continue light. Bar sellers generally will probably open books this week for next quarter, with the base on commercial steel bars unchanged at 1.80c, Pittsburgh, or 2.15c, New York.

Philadelphia—Steel bar tonnage over the past week has about held its own, although August as a whole probably showed some slight improvement. The base price on commercial steel bars is 1.80c, Pittsburgh, or 2.11c, Philadelphia.

Youngstown, O. — Specifications continue to keep bar mills engaged at a satisfactory rate. Business comes from a wide variety of miscellaneous sources. Some district mills report an increase of 16 per cent over July.

PRECISION *in* PRESSED STEEL





●This pressed steel cash register case — designed by Transue & Williams engineers — is an excellent example of the accuracy to fine detail we are able to procure in regular stamping production.

Note the depth in these two sections — each pressed from a single sheet. And observe the many slots, holes and ridges that must fit accurately when the case is placed over the assembly of the machine.

It is good practice to consult Transue & Williams FIRST for ideas on stamping design.

TRANSUE & WILLIAMS
ALLIANCE, OHIO
DESIGNERS & MAKERS OF DEEP DRAWN
STAMPINGS

Plates

Plate Prices, Page 140

Pittsburgh—Expectations are that a lot of 3000 tons of plates and structurals will be awarded by Treadwell Construction Co., Midland, Pa., for construction of a Mississippi river dam at Genoa, Wis. The contract was sub-let by the Siems-Helmer Co., St. Paul, which is low bidder on the original contract. Steel is to go into five steel roller gates, ten steel tainter gates, and service bridges for the gates, including electric operating machinery, the steel to be assembled at Midland, Pa., for deliveries beginning Nov. 1 and running a year.

Mississippi Valley Barge Line, St. Louis, has let 30 steel barges to American Bridge Co., Pittsburgh, requiring more than 7500 tons of plates and shapes. Barges will be 132 x 35 x 10 feet, with moisture-proof double shell hulls and cargo houses of steel with steel rolling doors and rolling hatches. Construction will start immediately to give prompt delivery. The barges will carry freight on the Ohio and Mississippi rivers.

Chicago—In the absence of active demand from railroads and equipment builders, building construction and miscellaneous users are taking most plate shipments. Roller gate construction for Mississippi river dams will require fairly large tonnages, though a portion of this work is going to eastern fabricators.

Cleveland—The market is quieter,

with only small, miscellaneous purchases by fabricators. The Marion Steam Shovel Co., Marion, O., has sublet to Treadwell Construction Co., Midland, Pa., its contract for building 24 coal barges for Raymond City Coal Co., Cincinnati, requiring 3600 tons of steel, mainly plates.

Boston—Plate orders for miscellaneous needs hold well and the aggregate tonnage in small lots is sustained. Boiler shops, truck body builders are slightly more active. Industrial demand, however, lacks snap. Several sellers report August sales slightly ahead of July.

New York—Contrary to trade expectations plate tonnage here last week showed a gain, with oil companies among the active buyers.

Philadelphia—Ship work leads in the local plate market. With operations at the plant of the New York Shipbuilding Co., Camden, N. J., being resumed after labor difficulties of more than three months, plate makers and producers of various other descriptions of steel are now receiving releases for navy work which is engaging the sole attention of the yard.

In addition, Sun Shipbuilding Co., Chester, Pa., has placed approximately 1000 tons of steel, principally plates, for the ferryboat to be constructed for the Virginia Ferry Corp. and approximately half will be rolled by a producer in this district. Further, the Sun Shipbuilding Co. is expected to make formal award momentarily of 8000 to 9000 tons of steel for the two tankers for Gulf Refining Co., New York, the estimated requirements having been revised downward from 12,000 tons. Plate makers are expected to open their books for fourth quarter this week, with base prices unchanged at 1.90c, Coatesville, Pa., or 1.99½c, Philadelphia.

San Francisco—Griffith Co., Los Angeles, has taken the general contract for the Cajalco dam and dike for the metropolitan water district, Los Angeles, involving 750 tons of ¼-inch plate for a reservoir. Bids have been taken on 175 tons, under schedule 4235, for the 12th naval district, San Francisco. Plate fabricators are interested in a proposed 60-inch welded steel pipe line for San Francisco, bids on which are expected soon.

Seattle — Fabricating plants have a fair assortment of small jobs on hand. Due to legal technicalities, Everett, Wash., has postponed indefinitely a call for bids for a water main extension to the new Weyerhaeuser pulp plant, about 1000 tons, estimated at $175,000. In the meantime bids will be asked for temporary service line to cost $45,000. Tacoma has been granted $243,000 federal funds for its projected water system extension. Bureau of reclamation has been given funds to complete the Sun River project, Mont., which will include $300,000 for spillway gates, Gibson dam.

Contracts Placed

7500 tons, plates and shapes, for 30 barges for Mississippi Valley Barge Line, St. Louis, to American Bridge Co., Pittsburgh.

150 tons, pontoon for Hydraulic Dredging Co., San Diego, Calif., to unnamed interest.

Unstated tonnage, five oil storage tanks, Norris Power plant. Tennessee valley authority, Knoxville, Tenn., to Graver Tank & Mfg. Co., East Chicago, Ill., bids Aug. 19.

Contracts Pending

9500 tons, 60-inch pipe line, San Francisco; bids soon.

750 tons, Cajalco reservoir, metropolitan water district, Los Angeles; general contract to Griffith Co., Los Angeles.

175 tons, welded ventilating pipe, metropolitan water district, Los Angeles; bids opened.

175 tons, schedule 4235, twelfth naval district, San Francisco; bids opened.

France to America in four days! . . . the "Normandie," De Luxe French Liner, set a new all-time record on her maiden trip from Le Havre to New York.

ULTRA-CUT STEEL

is the modern screw stock that keeps in tempo with the times. Today, there is a premium on *speed* as it puts extra profits in production. And Ultra-Cut "has what it takes" to boost machine output without sacrifice of quality. With faster feed, goes finer finish, increased tool life, and lower cost per part. Try Ultra-Cut Steel on your automatic screw machines, and you will gain a new conception of MACHINABILITY.

BETTER MADE STEELS LABORATORY TESTED

The shop foreman said this ⅞" jack screw caused "plenty trouble" in machining until Ultra-Cut Steel was put on the job. Then using a surface speed of 80' per min., and .0135 feed on drills, the time per part was reduced from 27 to 16 seconds with 70% longer tool life and vastly superior finish than former stock permitted. Read about other Ultra-Cut records in Folder No. 38.

Cold Drawn Bars and Shafting • Free-Cutting Screw Stock • Special Sections • Alloy Steels

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WITH THE SIMPLIFIED P & H-HANSEN ARC WELDER

Whether it's repair work or occasional production jobs around the shop, it's a matter of sound economy to own a P&H-Hansen Arc Welder. . . . Here's a welder that's built for years of tough service. The stable arc is "built in" . . . inherent . . . not obtained with external attachments. It's easier to operate, too, with simple current control over the entire welding range. Offered in all capacities from 50 to 800 Amps., portable, stationary or vertical models. Ask for Bulletin HW-3.

HARNISCHFEGER CORPORATION
4411 W. National Ave., Milwaukee, Wis.

Hope We'll See You
BOOTH 504
Exhibit Hall
Machine Tool Show

—The Market Week—

Sheets

Sheet Prices, Page 140

Pittsburgh — Shipments of sheets in August by important makers in this district exceeded July by about 15 per cent. More new business is coming out, both from the automotive industry and from miscellaneous sources. This has advanced the operating rates on common black to around 67 per cent and on galvanized to 66 per cent, while the full-finished grade is being made at 64 per cent. There likely will be some interruption Monday in the operating schedules of some of the independent mills. Stainless steel is moving from the mills in larger volume than in July and something like 30 to 40 per cent better than a year ago.

Cleveland — Specifications from automobile manufacturers have continued at a relatively slow rate during the past two weeks, with sheet mill operations here and in an adjacent lake district at 50 per cent. Heavier releases are expected shortly after Labor day, and it is understood Ford will buy 60,000 to 70,000 tons of flat rolled steel products about Sept. 10. Other lines, such as household utilities, and barrels, are fairly active and makers are buying regularly. Lists offering tonnages of sheet seconds are being put out by some manufacturers, and in one of these it is noted that cold-rolled seconds are offered at $37 a ton, compared with $55 for primes of the same basis. Even galvanized seconds are being offered, considerably under the market for primes. The resale of unmarked seconds is a problem difficult to control.

Chicago—Sheet bookings continue heavy and mill operations are approaching capacity in some instances. Automotive business is an important factor in bolstering incoming business, though miscellaneous users are contributing substantial orders. Further gains in automotive deliveries are in prospect for this month. Shipments against current contracts are to be completed by Sept. 30, though unchanged prices are expected to rule on fourth quarter business.

Boston—Sheet buying is slightly heavier and well spread as to consumer demand, blue annealed for small tank fabrication being outstanding, notably from several Fall River, Mass., shops. Jobbers are buying frequently, but generally in small lots.

New York—Sheet producers enjoyed fairly good business in this district in August, although the volume of sales of prime material was undoubtedly reduced by the abnormal volume of seconds, principally

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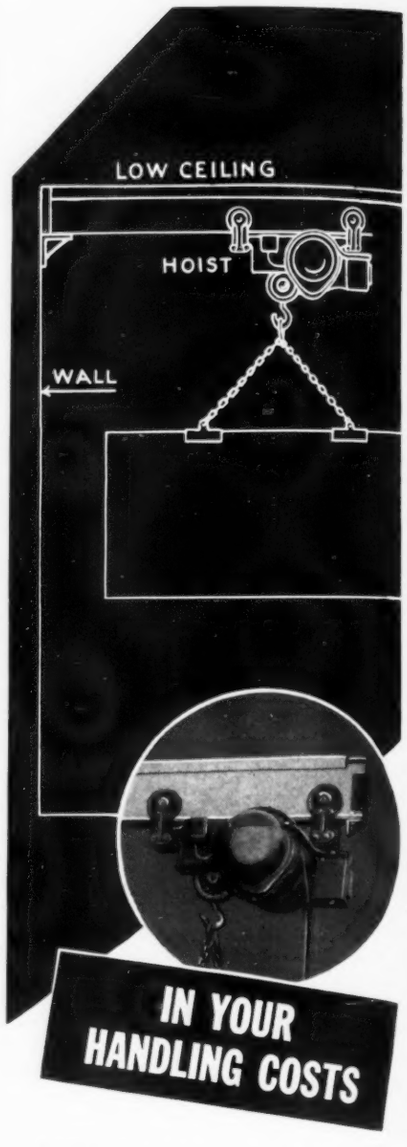

IN YOUR HANDLING COSTS

P&H hoist engineers can help you store your raw materials, and also speed up loading.

Note, for example, the manner in which they licked one storage problem where a manufacturer required low head room with a lift to within a few inches of the ceiling.

P&H engineers will carefully study your specific requirements before they recommend equipment. If they can't save you money, they'll frankly tell you so. Ask for catalog RH-2.

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Machine Tool Show

galvanized seconds, that is now being absorbed in this district. The situation with regard to seconds appears to be largely local and has been becoming increasingly more complicated. One development, as a result, has been the unsettlement of the market on prime grades of galvanized out of warehouse. Action now apparently in sight in the elimination of jobber extras by the producers may help to remedy this situation.

Philadelphia—August was one of the best months for sheet sellers here this year. Substantial autobody tonnage swelled the total, but there was also a good increase in miscellaneous demands. Some leading sheet sellers expect to open books for fourth quarter at once, with few changes of importance in price. Some mills have indicated that they will eliminate differentials to jobbers on all forms of galvanized sheets, effective Oct. 1. It is believed that this policy will become general among the mills.

Buffalo — September production of sheets shows a gain over the August rate which averaged slightly less than 50 per cent. The fourth quarter outlook is improving.

Youngstown, O.—Sheet sales in the past week have resulted in an encouraging inflow of orders and specifications, thus insuring continued good operations, while also adding to a backlog of three or four weeks' delivery. The new extras on galvanized and painted roofing and formed products as announced by several mills, are expected to call forth some discussion by the affected jobbers and other distributors, but the mills hold that this is the only way they know to correct a disturbing distributing situation in this branch of the industry. So far as can be seen at this time, this is the only change likely to be made in the sheet price schedule for the fourth quarter.

Cincinnati—Sheets mills in this district expect to reaffirm prices for fourth quarter, books to be open after Labor day. Production will be affected by a one-day suspension. Automotive demand slackened, attributed to model change-over, but the trend in other demand was toward greater volume.

St. Louis—Producers and distributors of steel sheets report further expansion in demand. Miscellaneous requirements are accounting for bulk of tonnage. Outlet through the building industry shows broadening tendencies due mainly to increase in construction of small resideces.

Birmingham, Ala.—Mills are fairly active and shipments are about equal to the make. Future prospects are bright, agricultural users being in market. The sheet market has been steadier than any other division of the steel industry here for a longer period.

Pipe

Pipe Prices, Page 141

Pittsburgh—Oil and gas fields still continue to absorb oil country goods, with some small lots of medium-sized line pipe interspersed. In the smaller sizes of pipe, boiler tubes seems to be the more active. Operating schedules of tube mills here continue 35 to 40 per cent.

Chicago—An early increase in moderate-size orders for cast iron pipe is looked for by producers, in view of increased tonnages involved in pending work. Awards recently have been light, but a fair number of orders are in prospect from small municipalities. Several hundred tons each are pending for Anna, Enfield, Marissa, and Sparta, Ill., and Milltown, Ind. Cast prices are steady.

Boston—Cast pipe inquiry is light, also buying, with few orders for more than 100 tons. Fitchburg, Mass., placed 150 tons with the Burlington, N. J., foundry and Lowell, Mass., closes this week on 200 tons. Merchant steel pipe is more active.

New York—While miscellaneous requirements for state highway work are heavier, cast pipe inquiry remains disappointingly small. Buying is light. A New Jersey utility bought about 100 tons in small sizes from two foundries.

Philadelphia—Pipe sellers here are figuring on some fair-size tonnages for the department of agriculture building and the Library of Congress addition, Washington on which Riggs-Distler Co., Baltimore, have the general heating and air-conditioning contracts. The library addition requirements will include 300 tons of wrought iron pipe. The pipe for the department of agriculture building is several hundred tons, largely steel.

Buffalo—Inquiry for all kinds of pipe continues unusually brisk for the season. Deliveries in the western New York area this year were near the peak of the past five or six years, and some good orders still remain to be placed. A continued active market is expected to follow actual allotments of federal funds, while private interests in the oil and gas fields also will continue to expand their line facilities.

Detroit—Detroit city council voted Aug. 27 to submit to voters at the primary Oct. 8 the question of the city embarking on the distribution of natural gas and a bond issue for defraying the cost of a pipe line to supply industrial consumers, estimated at $4,000,000.

Fort Worth, Tex.—An application for a $46,345,058 loan and grant to construct a natural gas pipe line from the Texas Panhandle to Detroit has been sent to PWA Administrator Harold L. Ickes in Washington by Julian Montgomery, acting PWA director for Texas.

San Francisco—Cast iron pipe manufacturers were disappointed when Los Angeles decided to use reinforced concrete pipe on the White Point outfall sewer instead of 2100 tons of 60-inch cast iron pipe. United States Pipe & Foundry Co. is low on 1995 tons of 6 and 8-inch pipe for San Francisco. No award has yet been made on 1250 tons of cast iron pipe and 260 tons of steel pipe for Price, Utah.

Seattle—Dealers are moving some small lots out of stock. Important projects are planned in the Pacific Northwest, but are not yet definite. Victor, Idaho, is asking bids for 225 tons; Bloomington, Idaho, for 200 tons, and Minersville, Utah, for 252 tons. Portland has divided a contract for 200 tons of 6, 8 and 30-inch cast iron pipe between United States Pipe & Foundry Co., Burlington, N. J., which will supply the 30-inch and Consolidated Supply Co., Portland, Oreg., Pateros, Wash., and Corbett, Oreg., have been given PWA assistance for water systems projects, the former $21,000 and the latter $51,000.

Cast Pipe Placed

200 tons, 6, 8 and 30-inch for Portland, Oreg., to United States Pipe & Foundry Co., Burlington, N. J., and Consolidated Supply Co., Portland, Oreg.
150 tons, Fitchburg, Mass., to United States Pipe & Foundry Co., Burlington, N. J.
130 tons, PWA projects, New York, to United States Pipe & Foundry Co., Burlington, N. J.
125 tons, 4 and 6-inch, Homedale, Idaho, to unnamed interest.

Cast Pipe Pending

2100 tons, 60-inch, White Point outfall sewer, Los Angeles; city has decided on reinforced concrete pipe.
1995 tons, 6 and 8-inch, San Francisco; United States Pipe & Foundry Co., Burlington, N. J., low.
400 tons, Anna, Ill.
300 tons, Milltown, Ind.
300 tons, Marissa, Ill.
250 tons, 12 and 20-inch, Binghamton, N. Y.
200 tons, Enfield, Ill.
200 tons, Lowell, Mass.; bids Sept. 4.
180 tons, 12-inch, Sparta, Ill.; Stiers Bros. Construction Co., St. Louis, general contractor.
Unstated tonnage, 4720 feet of 4 to 12-inch, Appleton, Wis.; bids close Sept. 3.

Steel Pipe Pending

260 tons, 14 and 18-inch, Price, Utah; bids opened.

Transportation

Track Material Prices, Page 141

Railroads are unusually quiet in the steel market and relatively little business is pending in rails, steel supplies or cars. Chesapeake & Ohio has not closed on its inquiry for 35,000 tons of rails. Pere Marquette is taking bids on 1700 tons of rails and 550 tons of tie plates for delivery to its lines in Ontario, Canada.

Chesapeake & Ohio has awarded 100 automobile freight cars to Coleman-Sanders Mfg. Co., a Pullman-Standard subsidiary, Richmond, Va. Pullman-Standard Car Mfg. Co., Chicago, has taken an order for 20 trolley coaches for the Cleveland Railway Co., Cleveland.

Railroad axles have been advanced $3 per ton.

Orders for railway equipment totaling $9,821,563 have been awarded to five plants in eastern Canada under the Canadian government's supplementary public works act of 1935. The equipment is being supplied to the Canadian National Railways and the Canadian Pacific Railway. The firms receiving orders are: Canadian Car & Foundry Co., Montreal, $3,613,549; Eastern Car Co., New Glasgow, N. S., $1,986,175; National Steel Car Co., Hamilton, Ont., $2,562,939; Montreal Locomotive Works, $1,166,000; Canadian Locomotive Works, Kingston, Ont., $492,900. Algoma Steel Corp., Sault Ste. Marie, Ont., and Dominion Steel & Coal Corp., Sydney, N. S., each receive orders for 40,000 tons of steel rails.

Car Orders Placed

Chesapeake & Ohio, 100 automobile cars, to Coleman-Sanders Mfg. Co., Richmond, Va., subsidiary of Pullman-Standard Car Mfg. Co., Chicago.

Cleveland Railway Co., Cleveland, 20 trolley coaches, to Pullman-Standard Car & Mfg. Co., Chicago.

Seaboard Air Line, two streamlined baggage and mail rail motor cars to St. Louis Car Co., St. Louis, with the power units to be supplied by Electro-Motive Corp., Cleveland.

Rail Orders Pending

Pere Marquette, 1700 tons, and 550 tons tie plates; for delivery to points in Ontario, Canada; bids being taken.

Tin Plate

Tin Plate Prices, Page 140

Pittsburgh — Tin mills continue to taper off in activities and are now around 70 per cent. This is a seasonable trend and resumption to the usual activities is expected to follow. Fourth quarter prices are expected to be announced individually by the mills shortly.

Boston—Tin plate specifications from the limited number of consumers in New England are heavier, with several vegetable and fruit packs under way. Sardines have also come in off the Maine coast resulting in a sardine pack, which failed last year because the fish did not run.

Cold Finished

Cold Finished Prices, Page 141

Pittsburgh—Makers of cold-finished steel bars are receiving some modest additions to their books from auto partsmakers and miscellaneous users. The operating rate is around 40 per cent.

Carpenter Holds Prices

Carpenter Steel Co., Reading, Pa., announces that it is opening its books Sept. 3 for fourth quarter business on high speed, carbon and alloy tool steels with no changes in base prices or extras.

STRONG
SMOOTH
SOUND *and*
Weighs only 1/3 *as much*
AS CAST IRON!

PERMITE ALUMINUM ALLOY CASTING
Made In A Permanent Mold

BACK AND FORTH, back and forth goes this washing machine agitator, requiring power to stop and start at every turn.

Think of the savings that result when it is made as a Permite Aluminum Alloy Casting! They're the same savings that prompt all industry to take a vital interest in this superior type of casting.

The light weight assures a power saving; and lower shipping charges, too. The smooth finish combined with close dimensional tolerance means lower finishing and machining costs. Uniformity of dimensions and weight is made certain by the permanent mold process of casting.

Don't let the higher cost per pound of aluminum prevent your investigation of Permite castings. The savings, in shipping costs, in working and finishing, and the high value of scrap and turnings, usually cut your final costs to approximately that of cast iron—*and you secure a highly superior casting.* The soundness, and the 25% greater strength that results from Permite's heat-treating, mean 100% casting satisfaction. Write for full information, or forward blueprints for recommendations and quotations.

ALUMINUM INDUSTRIES, Inc.
Cincinnati Ohio

PERMITE Aluminum Alloy CASTINGS
Permanent Mold ★ Semi-Permanent Mold ★ Sand Cast

Shapes

Structural Shape Prices, Page 140

New York—Structural steel demand is light with pending requirements confined largely to small projects, few taking more than 1000 tons. Cauldwell-Wingate Co., New York, is low on the Bronx postoffice, 2000 tons. Several sizable school projects are being planned for New York city, although bid dates have not been fixed.

Production of fabricated structural steel during July was 38.5 per cent of normal, according to the American Institute of Steel Construction. This compared with an operating rate of 38.3 per cent during June. July shipments were 40.5 per cent of normal, as against an average of 36.6 for seven months this year.

Pittsburgh — Bids were opened Wednesday by the county commissioners and the Allegheny county authority on the Homestead bridge project which involves about 8000 tons of structural steel. The formal letting of this contract and the placing of the steel, however, are both declared very indefinite. The project has been under consideration for over a year.

Cleveland — Western Automatic Machine Screw Co., Elyria, O., placed 400 tons with Fort Pitt Bridge Works, this being the largest award here in the week. Hunkin-Conkey Construction Co., general contractor, is expected to award 465 tons for the service building at Cleveland's easterly sewage disposal plant this week. Several other projects of similar size still are pending, but new work is light. Fabricated prices are firmer.

Chicago — Structural awards and inquiries are heavier, though bridges, post offices and river dam work comprise the larger portion of orders. The outstanding private inquiry is 975 tons for the International Harvester Co. building at East Moline, Ill. Several thousand tons still are pending for Mississippi river dams.

Boston—While still sluggish, structural steel inquiry is up slightly with additional public works projects about to come out. Two bridges at Millbury, Mass., 200 tons, close this week. Several postoffice projects in New England close within the next two weeks.

Philadelphia—Structural buying is expanding, although district fabricating shops report that most of the tonnage is still coming in from the outside. There is a good sprinkling of pending work, including some fair-size tonnages of local character. The largest tonnage placed recently involved 2350 tons of piling for a bulkhead at Wilmington, Del., and action is expected to be taken shortly on 2300 tons for the Archives building in Washington, on which McCloskey & Co., Philadelphia, are the general contractors.

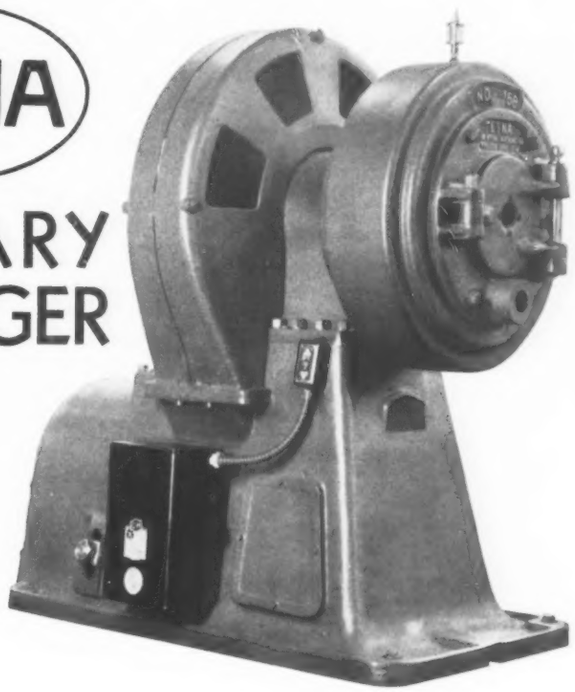
The Lehigh Structural Steel Co., Allentown, Pa., continues to add to its recent string of contracts, having booked two additional tonnages within the past week and being reported to have taken in addition 800 tons for the postoffice at Atlantic City. Some of this work is being sublet, with the Lukens Steel Co., Coatesville, Pa., understood to have taken a

Shape Awards Compared

	Tons
Week ended Aug. 31	22,805
Week ended Aug. 24	13,808
Week ended Aug. 17	27,001
This week, 1934	15,790
Weekly average, 1934	16,284
Weekly average, 1935	15,208
Weekly average, August	18,336
Total to date, 1934	617,036
Total to date, 1935	547,501

ETNA

ROTARY SWAGER



This Etna Rotary Swager No. 158 is of the Timken Roller Bearing type.

The spindle is hardened and ground, and dies are easily controlled to accommodate very small material.

Etna Swaging Machines are built in capacities from 3/8" to 4" or more diameter and in die lengths up to 18".

The appearance of Etna Swagers do credit to any plant, and their ready accessibility stands strongly in their favor.

THE ETNA MACHINE COMPANY

3400 Maplewood Ave.
TOLEDO, OHIO

fabrication contract for at least 500 tons of plates and the Phoenix Bridge Co., Phoenixville, Pa., an order for approximately 1000 tons of girders. Shape prices will likely be reaffirmed for fourth quarter this week.

Birmingham, Ala.—Numerous contracts are being received by fabricating shops, mainly in small lots. Nashville Bridge Co. will fabricate 200 tons structural steel for the first grade elimination job in this district.

San Francisco—Shape awards exceeded 4000 tons and brought the total for the year to 72,940 tons, compared with 94,531 tons for the corresponding period in 1934. Unnamed interests took 1000 tons for the custom house and 700 tons for the mint addition in Denver. Golden Gate Iron Works booked 590 tons for a telephone building in San Francisco. Pacific Coast Steel Corp. was low bidder on 5500 to 5750 tons for transmission towers for the metropolitan water district, Los Angeles.

Seattle — Some heavy tonnages will be required for PWA projects now under consideration for the Pacific Northwest. Seattle city council has approved an appropriation of $870,000 for five grade separation jobs. Additional contracts for structural items for the Grand Coulee, Wash. dam are pending. The week's largest award, 500 tons for a six-span Alaska roads commission bridge over Knik river, Alaska, went to Duffin Iron Works, Chicago.

Behind the Scenes with STEEL

En Avance!

ON A SWING up through the Buffalo and Jamestown, N. Y., district recently we came across a number of signs indicating that industry has shaken off its five-year fever of depression. Bethlehem's new continuous mill at Lackawanna was swarming with men and although the mill building itself is not yet completed, it is an imposing spectacle, stretching back thousands of feet from the highway. We were told in Buffalo that industrial activity there was leading the country in the upswing. Orders coming in from abroad, production chiefs wrinkling their brows trying to find enough skilled labor, the Statler hotel grill bursting with hungry patrons, old buildings being remodeled for today's styles, new cars everywhere.

Even the engineers on those dinky yard locomotives blow their whistles as though they really meant it and not as if to say, "Well, if you want to get out of the way, O. K., but you might just as well be run over." We felt so good we bought two extra cocktails that night at dinner and put 'em on the expense account. The hell with it!

* * *

Extra Dividend

BY THE TIME you have reached this point in today's issue you will have seen the results of our editors' efforts to signalize and focus attention on the National Machine Tool Show which opens in Cleveland next Wednesday. We hope you have enjoyed reading and looking over the many extra features in this issue.

Guy Hubbard's summary of past contributions to our *Forum on Modernization* contains plenty of food for thought. Page after page of descriptions of new machinery and tools are silent testimony to the ingenuity and tireless effort of designers and builders. Furthermore, we hope you will not overlook the messages which our advertisers have directed to you.

What more profitable way is there to spend this evening than to take this issue home with you, study it over and see if it does not answer some of your problems? Shake off that Labor Day hangover with an easy chair and a copy of STEEL.

* * *

More Gravy

SPEAKING of special issues, there will be another one along in three weeks, with complete advance information on the National Metal Congress and Exhibition which opens in Chicago, Sept. 30. Special articles to be included in this issue will deal with the processing and treatment of metals, subjects which will receive major attention at the congress. And all this for only 5.7 cents per copy, if you are a two-year subscriber. How do we do it?

* * *

Ghosting

THIS ad in a large metropolitan daily struck our wandering eye the other day:

> GHOSTWRITERS' BUREAU — Spend a little money and save a lot of time. Hire your writing. Many busy men do. We write it—*you* sign it. We do the work—*you* get the credit of authorship.

There's a business. Can't you see those rows of frowning shades seated at rows of ethereal typewriters pounding out line after line about what J. Bulpington Twitch of the Twitch Mfg. Co. thinks in public about the economic situation; about how E. Redfern Hollingtooth made a million dollars in the soap business; and about a hundred other subjects on which the great reading public is avidly waiting for comments of busy men. Somehow or another we're always a little suspicious of those propositions where "we do the work—*you* get the credit" is involved. Ghosts are too apt to have empty ideas in addition to empty frames.

* * *

Grateful Snake

THERE'S a good fish story going the rounds which maybe you fellows who have been away on vacations haven't heard. It seems a gent who was busily engaged in reeling them in up north somewhere happened to look down to the ground for a moment when, beside the log on which he was standing, he noticed a snake with a small frog in its fangs.

Realizing the scarcity of good bait, he took a bottle of ——* whiskey from his hip pocket and poured a slug down the snake's throat. Immediately the reptile dropped the frog and slithered away. The fisherman picked up the bait, applied it to his hook and whipped it out into the stream again. After a few minutes of watching his line he became conscious of a gentle but firm tugging at one of his boots. Paying no attention at first, he finally looked down to see again his friend the snake—this time with two squirming frogs gripped firmly in his jaws.

*Name on request.

—SHRDLU

Shape Contracts Placed

3650 tons, postoffice, San Antonio, Tex., to McClintic-Marshall Corp., Bethlehem, Pa.

3300 tons, dam No. 18, Burlington, Iowa, to American Bridge Co., Pittsburgh.

2350 tons, piling, bulkhead, Wilmington, Del., for the United States engineer, Philadelphia, awarded through Thomas Earle & Sons, Philadelphia, to Kalman Steel Corp., Bethlehem, Pa.

1560 tons, depressed highway, Queens connection, Triboro bridges, New York, to Harris Structural Steel Co., New York; Woodcrest Construction Co., general contractor.

1460 tons, highway bridge, for state of West Virginia, at Parkersburg, to McClintic-Marshall Corp., Bethlehem, Pa.

1100 tons, bridge superstructure, Clinch river and Sycamore creek, near Day Mills, Tenn., TVA project, to McClintic-Marshall Corp., Bethlehem, Pa., at $109,429.82, bids Aug. 12.

1000 tons, custom house, Denver, to unnamed interest.

800 tons, post office, Atlantic City, N. J., reported placed with Lehigh Structural Steel Co., Allentown, Pa.

700 tons, mint addition, Denver, to unnamed interest.

590 tons, telephone building, San Francisco, to Golden Gate Iron Works, San Francisco.

525 tons, building, Aniline Co., Rensselaer, N. Y., to the Belmont Iron Works, Eddystone, Pa.

500 tons, 6-span bridge, Knik river, Alaska, for Alaska road commission, to Duffin Iron Works, Chicago.

490 tons, bridge, Delaware & Hudson railroad, Sidney, N. Y., to American Bridge Co., Pittsburgh.

450 tons, bridge, Alfalfa county, Oklahoma to Patterson Steel Co., Tulsa, Okla.; Hyde Construction Co., Enid, Okla., general contractors.

425 tons, factory, Wilkes-Barre Lace Mfg. Co., Wilkes-Barre, Pa., to the Weatherly Steel Co., Weatherly, Pa.

400 tons, building, Western Automatic Machine Screw Co., Elyria, O., to Fort Pitt Bridge Works, Pittsburgh.

400 tons, bridges, Nebraska, for Chicago, Burlington & Quincy railroad, to American Bridge Co., Pittsburgh.

360 tons, state highway bridge, Huntington, W. Va., to Mt. Vernon Bridge Co., Mt. Vernon, O.

315 tons, shop extension, American Locomotive Co., Schenectady, N. Y., to Pittsburgh Bridge & Iron Works, Rochester, Pa.

300 tons, factory building, Celanese Corp., Baltimore, to Belmont Iron Works, Eddystone, Pa.

250 tons, parcel post building, Detroit, to Hansell-Elcock Co., Chicago.

220 tons, state highway bridge, Rapid River, Mich., to American Bridge Co., Pittsburgh.

225 tons, building, Detroit, to McClintic-Marshall Corp., Bethlehem, Pa.

210 tons, factory building, Sterling Silk Glove Co., Allentown, Pa., to the Lehigh Structural Steel Co., that city.

200 tons, skating rink, Denver, to the

E. Burkhardt & Sons Steel & Iron Works Co., Denver.

200 tons, bridge, Morehead, Ky., to Bethlehem Fabricators Inc., Bethlehem, Pa.

170 tons, school, Poland, N. Y., to Syracuse Engineering Co., Syracuse, N. Y.; through North Park Realty Co., Buffalo.

135 tons, plant addition, Paraffine Co., Emeryville, Calif., to Moore Drydock Co., Oakland, Calif.

120 tons, warehouse, South San Francisco, to Pacific Coast Steel Corp., San Francisco.

100 tons, replacements at Tacoma smelter and miscellaneous work, to Steel Fabricators, Inc., Seattle.

100 tons, John Muir high school, Los Angeles, to Pacific Iron & Steel Co., Los Angeles.

100 tons, mill building, Penn-Dixie Cement Co., Nazareth, Pa., to Lehigh Structural Steel Co., Allentown, Pa.

100 tons, factory addition, Philadelphia Storage Battery Co., Philadelphia, to the Norris Iron & Wire Co., Bridgeport, Pa.

Shape Contracts Pending

9000 tons, state bridges, Missouri.

5500 to 5750 tons, transmission towers, metropolitan water district, Los Angeles; Pacific Coast Steel Corp., San Francisco, low bidder.

4200 tons, including 3000 tons of piling, dam No. 11, Dubuque, Iowa; Maxon Construction Co., Dayton, O., low for general contract. R. C. Mahon Co., Detroit, low for fabricated steel.

3300 tons, sheet steel piling, Government Island bulkhead, Oakland, Calif.; bids opened.

2000 tons, postoffice, Bronx, N. Y., Cauldwell-Wingate Co., New York, low, bids Aug. 27.

2000 tons, dam No. 8, Genoa, Wis.; Treadwell Construction Co., Midland, Pa., low.

975 tons, plant building, East Moline, Ill., for International Harvester Co., Chicago.

800 tons, state highway bridge, New York; bids Sept. 17.

650 tons, grade crossings, Tomkinsville and Stapleton, Staten Island, N. Y.; bids Sept. 20.

600 tons, bullion depository, Ft. Knox, Ky.

350 tons, I-beam tunnel ribs, specification 121, metropolitan water district, Los Angeles; bids opened.

325 tons, bridge, Kiowa, Kans.

300 tons, sewage plant addition, Washington.

300 tons, estimated, postoffice, Chester, Pa., bids Sept. 23; this project was originally up two or three months ago, at which time the George A. Fuller Co., Philadelphia, was low.

275 tons, cranes, Granite City Steel Co., Granite City, Ill.

250 tons, building, United States Playing Card Co., New Brunswick, N. J.

225 tons, tainter gates, Angeles, Tex.

200 tons, two state bridges, Milbury, Mass.

150 tons, children's state hospital building, Mt. Morris, N. Y.

140 tons, lighting standards for Golden Gate bridge, San Francisco; general contract to Alta Electric Co.

100 tons, state sanitarium, Apple Creek, O.; bids Sept. 9.

Unstated, 92-foot steel girder state bridge, Klamath Falls, Oreg.; bids Sept. 5.

Reinforcing

Reinforcing Bar Prices, Page 141

New York—Heavier inquiry for highway mesh and state bridge requirements features the reinforcing steel demand. Buying is slightly heavier. Several thousand tons of mesh and bars are up for New York and New Jersey highway projects. Small lot buying is fair.

Pittsburgh — Makers of concrete reinforcing bars here are considerably encouraged over the awarding of the first progress work administration projects in Indiana, Michigan, and New York, involving some good tonnages of reinforcing bars for road work. They are hopeful that much more additional work will be placed shortly.

Cleveland — Patterson-Leitch Co., Cleveland, has been awarded 300 tons for the administration building at the city's easterly sewage disposal plant, and also is understood to be scheduled for about 150 tons for the service building at the plant this week. Numerous jobs still are pending, with actual awards relatively small. In-

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dustrial work includes award of 125 tons for a building for the Elwell-Parker Electric Co., Cleveland.

Chicago—Concrete bar orders still are confined principally to small lots and total tonnage involved lacks improvement. Pending work points to a fair increase in bookings during coming weeks, most of the prospective business being for public work. The federal work relief program is expected to get under way within another 30 days, but steel requirements still are indefinite. Several thousand tons of bars for Mississippi river dams remain to be placed.

Boston—Reinforcing steel buying is light, mainly in small lots, but inquiry is heavier with indications of work developing within the next six weeks taking several thousands tons.

Philadelphia—Softness in prices, which has been noticeable in some adjacent districts, has apparently extended to this district, this not only applying to billet steel bars but to rail steel bars. On one tonnage of billet steel bars to be placed in this district recently, a concession of several dollars a ton is reported. The largest order reported in this district recently invoved 750 tons for a reservoir at Reading, Pa. A fair amount of tonnage is pending.

San Francisco—Four distributors in the Los Angeles district submitted identical bids on 72,470 to 104,630 tons of reinforcing bars for the metropolitan water district, Los Angeles, the former tonnage to be delivered prior to July 1, 1936, and the latter prior to Jan. 1, 1939. Alternate bids on 23,300 tons of rail steel or billet bars, delivery prior to July 1, 1936, were $1,208,771.80 and $1,208,768.80, respectively. On rail or billet steel for delivery prior to Jan. 1, 1939, calling for 34,610 tons, the bids were $1,780,432.40 and $1,887,377.30, respectively. On 12,550 tons of intermediate grade billet bars, delivery prior to July, 1936, and on 23,000 tons of the same, delivery prior to Jan. 1, 1939, the quotations were, respectively, $715,972.50 and $1,289,657.80. On 24,470 tons and 26,180 tons of modified intermediate billet bars for delivery prior to July 1, 1936 and Jan. 1, 1939 the prices were $1,531,828.12 and $1,641,887.82, respectively. These quotations include size differentials, cutting and bending, and testing welded joints in some instances.

Seattle — Demand for concrete bars is not active, no large specifications being out. Volume is largely from public works sources. Unnamed eastern interests are reported to have taken 1100 tons for the Alcova dam and 1225 tons for the Seminole dam, both near Casper, Wyo. For the former the general contractors are W. E. Callaham, Dallas, Tex., and Gunther & Shirley, Los Angeles, while Winston Bros., Minneapolis, have the Seminole general award.

Concrete Awards Compared

	Tons
Week ended Aug. 31	**4,037**
Week ended Aug. 24	**2,538**
Week ended Aug. 17	**7,382**
This week in 1934	**3,815**
Weekly average, 1934	**4,084**
Weekly average, 1935	**4,263**
Weekly average, August	**3,829**
Total to date, 1934	**176,706**
Total to date, 1935	**153,464**

Reinforcing Steel Awards

1225 tons, Seminole dam, Casper, Wyo., to unnamed interest; Winston Bros., Minneapolis, general contractor.

1100 tons, Alcova dam, Casper, Wyo., to unnamed interest; W. E. Callahan, Dallas, Tex., and Gunther & Shirley, Los Angeles, joint contractors.

750 tons, reservoir, Reading, Pa., awarded through Y. E. O. Construction Co., Philadelphia, general contractor, to the Taylor-Davis Co., Philadelphia.

325 tons, bars and mesh, grade crossing, Elm Park and Mariners Harbor, Staten Island Rapid Transit Co., Staten Island, N. Y., to National Bridge Co. division of Jones & Laughlin Steel Corp., Pittsburgh; through McElroy & Kerwin Inc.

312 tons, auditorium, Fresno, Calif., to Kyle & Co., Fresno, Calif.

300 tons, bids 14978, Los Angeles, to Concrete Engineering Co., Los Angeles.

300 tons, administration building, easterly sewage disposal plant, Cleveland, to Patterson-Leitch Co., Cleveland.

275 tons, plant building, Quaker Oats Co., St. Joseph, Mo., to Joseph T. Ryerson & Son Inc., Chicago.

240 tons, high school, Haverstraw, N. Y., to Fireproof Products Co., New York; through F. H. Bogart.

200 tons, Toutle river bridge, Washington, and Ballard trunk sewer project, Seattle, to Pacific Coast Steel Corp., Seattle; Sheble Construction Co., Seattle, general contractor.

175 tons, sewage disposal plant, Chicago Heights, Ill., to Inland Steel Co., Chicago.

125 tons, outfall sewer, District of Columbia, through the Kaufman Construction Co., Philadelphia, to the Kalman Steel Corp., Bethlehem, Pa.

125 tons, building, Elwell-Parker Electric Co., Cleveland, to Kalman Steel Corp., Bethlehem, Pa.

100 tons, dam, Leesville, O., for Muskingum conservancy district, to Fort Pitt Bridge Works, Pittsburgh.

100 tons, John Muir high school, Los Angeles, to unnamed interests.

Reinforcing Steel Pending

72,470 to 104,640 tons, specification 109, metropolitan water district, Los Angeles; identical bids submitted by four Los Angeles distributors.

5125 tons, placing, Cajalco dam and dike, metropolitan water district, Los Angeles; general contract to Griffith Co., Los Angeles, at $4,646,856.

1400 tons, mesh and bars, highways and bridges, New York state; bids Sept. 17.

550 tons, dam No. 11, Dubuque, Iowa; Maxon Construction Co., Dayton, O., low for general contract.

500 tons, specification 7474, fleet air base including barracks, Pearl Harbor, T. H.; bids being taken.

450 tons, building, for Brown-Forman Distillery Co., Louisville, Ky.

350 tons, bridge, Benton Harbor, Mich.

300 tons, highways and bridges, Milbury, Mass.

125 tons, postoffice, Chester, Pa., bids to Sept. 23; this project was originally up in the spring, at which time the George A. Fuller Co., Philadelphia, was low.

100 tons, building, Abbott Laboratories, North Chicago.

100 tons, building, Griffith Laboratories, Chicago.

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100 tons, Goldberg's Furniture store, Oak Park, Ill.
100 tons, postoffice, Fond du Lac, Wis.

Wire

Wire Prices, Page 141

Pittsburgh—Jobbers are beginning to cover their needs on general wire products, but manufacturers' wire continues the current big tonnage factor in the market. Wherever the new wire extra schedule provides a reduction to the user, the new method of quoting has gone into effect; but where higher prices may result, the old basis continues in effect for the remainder of third quarter.

Cleveland—The new system of quoting merchant wire products is now in effect, as reported in STEEL, Aug. 26, page 68, and appears to be meeting general approval, according to sellers. A lighter volume of business is being done in manufacturers' wire, which is believed to be temporary, and demand from agricultural areas has tapered.

Chicago—Demand for manufacturers' wire is steady and buying of merchant products in rural districts is commencing to show some betterment. Further expansion in activity in wire products is looked for with the conclusion of the farmers' busy period in the fields. Prospects for a maintenance or increase in manufacturers' wire consumption are regarded as favorable, particularly since automotive requirements will increase after the changeover period now being experienced. Fourth quarter books are to be opened this week, with unchanged prices expected to prevail.

Boston — Wire buying is brisk, specialties and manufacturers' wire leading in demand. Merchants' wire and rope, while lagging, are moving better than several weeks ago and well ahead of last year. Cable departments are more active, also spring wire with buyers generally asking quick delivery.

Philadelphia—A strong and highly diversified demand for wire products prevails. Demand is regarded as the best in a number of weeks. Sellers are expected to open books this week for next quarter.

San Francisco—Bids have been opened by the metropolitan water district, Los Angeles, for 3080 tons of copper wire or 2000 tons of aluminum wire for a transmission line. Columbia Steel Co. and Aluminum Co. of America submitted identical bids on aluminum wire at $625,943 and Phelps Dodge Copper Co., Anaconda Wire & Cable Co., Columbia Steel Co., and General Cable Corp. quoted identically on copper wire at $857,823. This is the largest tonnage up for figures in over two years.

Strip Steel

Strip Prices, Page 141

Pittsburgh—Needs of auto partsmakers for narrow strip are increasing the volume of new business now on mill schedules, especially for cold-rolled grades. Production of hot-rolled strip continues around 40 per cent of capacity. Important makers of wide strip continue to report satisfactory operating schedules.

Cleveland—Relatively light specifications for strip steel were received from automobile manufacturers but makers expect a considerable increase in volume after Labor day. Orders from barrel and shovel manufacturers are fairly good.

Chicago—Strip demand from the automotive industry shows some improvement, but orders from miscellaneous users continue to provide the principal support to the market. August business compared favorably with that of July and gains noted lately are expected to be carried into September. Books are being opened for fourth quarter with recent prices expected to be continued.

Boston—Slow, but steady gain in cold strip demand is reported by most sellers with miscellaneous needs furnishing most volume. Hot strip is more active with rerollers building up stocks.

Philadelphia — Strip tonnage, while light compared with normal times, was more active in August, with the outlook favorable for further improvement this fall. Books will probably be opened this week for fourth quarter with base prices unchanged at 1.85c, Pittsburgh, or 2.16c, Philadelphia, on hot strip, and 2.60c, Pittsburgh, or 2.91c, Philadelphia, on cold strip.

Youngstown, O.—Strip mills are operating at 55 to 60 per cent of capacity on narrow widths and almost equally well in the twilight zone separating wider widths from sheets. Auto partsmakers are forwarding an increasing volume of specifications for narrow widths.

Semifinished

Semifinished Prices, Page 141

Some mills are showing more interest in forward requirements for semifinished steel with sheet bars leading in shipments. Most users of forging billets are covered to the fourth quarter at the $32 figure, the advance to $35 to become effective for fourth quarter. Skelp users are taking shipments regularly and wire rod users also.

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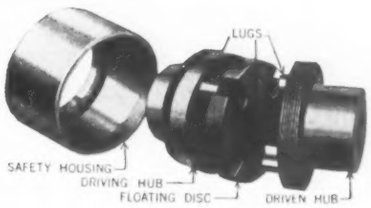

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Pig Iron

Pig Iron Prices, Page 142

Pittsburgh—Various foundries are taking small lots of pig iron, largely No. 2 foundry and malleable, although the occasional operation of steel foundries also requires some basic. Prices for fourth quarter are being reaffirmed along the lines that have held for a year and a half, which are: Bessemer, $19, furnace; No. 2 foundry and malleable, $18.50, and basic, $18.

Cleveland—Inquiries indicate volume buying of pig iron will develop some time in February for fourth quarter. It is the present intention of producers to give consumers an opportunity to cover requirements at current prices and then to advance 50 cents to $1 a ton for the remainder of the year. Melters' inventories are low. Shipments from lake furnaces in August were approximately 35 per cent heavier than in July.

Chicago—Fourth quarter books are being opened with prices unchanged at $18.50, furnace, for No. 2 foundry and malleable. Higher quotations some time in the fourth quarter are regarded as a likely development. August shipments were about 30 per cent larger than July, this gain being considerably larger than anticipated and producers are revising upward their predictions of probable deliveries the rest of 1935. September will see heavier shipments to automotive interests, while farm implement manufacturers are holding to recent active schedules. Machine tool builders, while not so busy as recently, are maintaining good operations, with fairly heavy backlogs.

Boston — Pig iron sales are in small lots, but slightly more numerous. Outlook for machine tool requirements is the most promising feature of the market. Books have been opened for the last quarter at unchanged prices.

New York—Pig iron sellers opened their books this week for fourth quarter at unchanged prices. Sales the past week tapered off, but most sellers report a gain not only in shipments but also in sales for August.

Philadelphia—Few products here have shown such an increase in shipments as pig iron, one seller experiencing a doubling of shipments, compared with two months ago. To date this has reflected little anticipatory buying and indicates an actual increase in the melt. Both malleable and foundry grades have participated. Consumers generally look for no advance in prices the next few weeks, but are certain there will be no reduction, notwithstanding softer prices noted occasionally on foreign iron. Increased demand for export is likely to follow a more serious turn in the Italio-Ethiopian situation.

Buffalo—Late August shipments of iron by Buffalo merchants showed a decided gain, making the month's deliveries almost the best this year. Sellers report a good portion of their trade covering for fourth quarter, now that prices have been established at the old level. Negotiations are in progress for barge canal fleets to move a good tonnage of iron this month. Melt in radiator works is reported on the up grade. Seven furnaces are in production.

Youngstown, O.—Pig iron sales continue to consist largely of small lots, mainly of malleable and foundry grades. Sales of basic and bessemer are infrequent. Immediate shipment is urged.

Cincinnati — Pig iron prices for fourth quarter are to be reaffirmed, when books are opened after Labor Day, at $18.50, base, Hamilton, for No. 2 foundry, with usual differential on southern iron. Shipments have continued unabated. Some important interests shipped nearly 40 per cent more iron during August than in July, reflecting steady melt in most foundries, with decided increase for those supplying machine tool manufacturers.

St. Louis—The market for pig iron continues active. Total deliveries to melters in this area during August, according to preliminary reports, exceeded the total of the preceding month by a fair margin, and represented the largest August tonnage in four years.

Birmingham, Ala.—The market is maintaining its strength and further improvement during September is indicated. Cast iron pressure pipe makers are placing a little more tonnage. Shipments of 1000 tons of iron by rail and water to Baltimore, and 350 tons to Chicago by water from Birmingham are noted this week.

Toronto, Ont.—New business continued quiet the past week, although local blast furnace representatives look for a speeding-up in demand the next two or three weeks. Placing of rolling stock orders is expected to stimulate consumption of iron. Current pig iron sales are confined to single car lots, with total awards for the week about 500 tons. The daily melt holds at 45 per cent of capacity. Pig iron production, in turn, is holding at its peak level for the year, with increased output expected soon with rail mills starting on Canadian National contracts. Pig iron prices are firm.

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Metallurgical Coke

Coke Prices, Page 141

Demand for by-product coke is dull and production is at a minimum, with prices nominally unchanged. Pittsburgh users are taking small lots but little new business is developing. At Chicago prices of by-product coke have been extended into September. Shipments in August were 10 to 15 per cent heavier than in July. Cincinnati dealers look for increased demand from automotive sources in September. Shipments are above the usual summer volume in

the St. Louis district, because of heavier foundry melt. Ovens in the Birmingham, Ala., district are maintaining production at unchanged level.

Scrap

Scrap Prices, Page 143

Pittsburgh—Interest in the scrap market here had tapered somewhat with mills refraining from buying until after the holiday at least. This Labor Day interruption seems likely to delay awards on railroad lists which apparently were due this week. Quotations are firmly held but unchanged.

Cleveland — Prices of blast furnace scrap grades have been adjusted to a slightly higher level on a strong but only slightly active market. Steel grades are quiet as melters are not covering.

Chicago—The recent sharp upturn in scrap prices has been halted, at least temporarily, and sellers have lowered their bids in covering previous contracts. Heavy melting steel is unchanged at $12.50 to $13, but dealers and brokers who recently were bidding as high as $13.50 in covering, now are offering only $12.50 to $12.75. Steady consumption and shipments to mills help to retain strength at present levels.

Boston — Scrap prices are strong, machine shop turnings advancing 25 cents a ton, dealers paying $3.25 to $3.50 for shipment to the Pittsburgh district. Skeleton and wrought pipe are also firmer. Buying for export continues active at unchanged, but strong prices. Domestic shipments are heavier, both to New England consumers and Eastern Pennsylvania, breakable cast being in good demand for the latter district.

New York—Scrap prices are stronger, heavy melting steel for Eastern Pennsylvania bringing $9 and $8, f.o.b. Northern New Jersey. Export prices are unchanged with buying active. Dealers are paying higher prices for heavy breakable cast, rails for rolling, turnings and No. 1 railroad wrought.

Philadelphia—Scrap prices on several leading grades have again advanced here. No. 1 steel is now holding flatly at $12, delivered, consuming plants, and No. 2 steel at $11, and it appears likely that on any new tonnage of size still higher prices would have to be paid. As a matter of fact, brokers are now paying $12, delivered, against tonnages booked at that figure.

Buffalo—Dealers have increased their nominal price lists and now claim they will not sell No. 1 heavy melting steel for less than $12. They admit inability to obtain this price as yet athough some are said to be considering the possibility of shipping scrap to other consuming centers. The entire list is nominally stronger and dealers' asking prices are up fully $1 a ton on the average from the contract quotations of the earlier part of this quarter. Malleable, stove plate and cast are reported to have changed hands in substantial volume and more buying still is in progress.

Youngstown, O.—New business in iron and steel scrap continues routine since consumers here are fairly well supplied. Shipments continue steady, both of steel and cast grades.

Detroit—Prices are a little stronger due largely to outside demand, which at the end of the week was somewhat lighter than at the beginning. Automotive scrap offerings continue light, but will expand substantially this month. A fair-size sale for shipment to a Cleveland mill was made last week. A good movement to Buffalo is reported. No. 1 steel is up 25 cents to $9.50 to $10, bundles are also up 25 cents to $10 to $10.50, with 50-cent rises in borings, No. 1 busheling and forge flashings, and 25-cent advances in turnings.

Cincinnati — Dealer activity in scrap continues, all holding material tightly. Meanwhile melters show resistance to higher prices and remain out of the market. Quotations are nominally unchanged although further strength is shown.

St. Louis—Under scant offerings and sympathy with strength of other markets, iron and steel scrap prices here have scored further substantial advances. Cast grades are particularly strong, including railroad malleable. This development reflects heavier working schedules at jobbing foundries and certain specialty shops.

Birmingham, Ala. — With heavy stocks carried by dealers, iron and steel scrap is not active. Larger consumers of heavy melting steel have been purchasing direct, one using old rails. Scrap quotations are unchanged but the tone is firmer.

Seattle — While local mills are not aggressive they are buying odd lots of prepared automobile scrap, the going price being $7.50 gross. No improvement in the export situation is reported, China being completely out and Japan placing no new business.

Toronto, Ont.—Iron and steel scrap markets are dull with demand at a standstill although there are prospects for improvement before the end of September. Mills are taking small lots of heavy melting steel.

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Warehouse

Warehouse Prices, Page 144

DISTRIBUTORS of galvanized and painted formed roofing products have been informed by several mills of a new series of extras. The announcement states:

"Base price applies on straight carloads of flat-rolled products, including roofings and sidings. For less than carload shipments these extras apply: 50 squares or over but less than a carload, 20c per square, any gage; less than 50 squares, 30c per square, any gage.

"When shipped in mixed cars with wire products, quantity extras are these:

"Carloads made up of wire and less than carload quantities of galvanized and/or painted formed roofing will carry the following quantity extras on the roofing products:

"50 squares or over but less than a carload, 5c per square, any gage; less than 50 squares, 10c per square, any gage.

"Note: Mixed carloads made up of wire and galvanized and/or painted formed roofing products, when a combination of the products is necessary to make the carload, may be shipped on jobber's order direct to jobber's customer to points where jobber does not maintain warehouse stock, at the following extras for the formed roofing products:

"50 squares or over but less than a carload, no charge; less than 50 squares, 5c per square, any gage.

"Less than carload galvanized and/or painted formed roofing products when shipped on jobber's order direct to jobber's customer to points where jobber does not maintain warehouse stock:

"50 squares or more, 10c per square, any gage; less than 50 squares, 20c per square, any gage."

Commenting upon the new extra series, mill representatives point out that it is an endeavor to iron out inequities which have grown up in the formed products industry. Formerly allowances of $2 and up to $4 a ton were made to various distributors, but these now are done away with. Instead, these same quantity extras will apply in all districts, whether east or middle west.

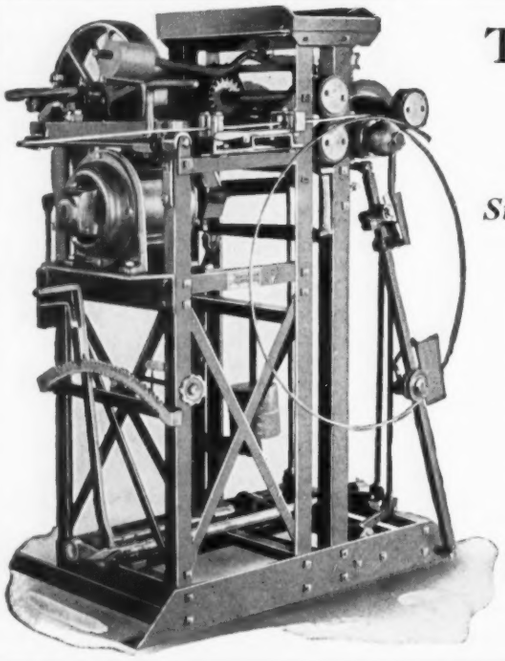
The former allowances actually were found to work hardships in certain districts when competition became very keen locally. It was in an attempt to remedy these difficulties and put all distributors upon the same basis that the new extras have been adopted, say the mill managers.

Cleveland — Warehouse business increased 10 to 15 per cent in August over July, whereas generally there is a reduction between these months. For the year to date, volume is about 33 per cent, and in a few instances 50 per cent, over the comparable period in 1934. It appears makers of cold-finished carbon steel bars generally will put the new list of extras in effect Oct. 1, as outlined in STEEL, Aug. 26, page 67. There has been some discussion as to whether warehouses would make adjustments in their cold-finished bar prices Sept. 1, but it has been decided to defer such action until Oct. 1.

Chicago—August sales were equal to or better than those of July, in addition to being substantially ahead of the volume a year ago. Bars and flat rolled material continue in best demand. Prices are unchanged.

Boston—Volume in August held to that of the previous month, aggregate sales being better than expected. Demand in the machine tool and rural districts has improved. Prices are steady and unchanged since adoption of new size extras on hot rolled bars.

Detroit—Warehouse business in



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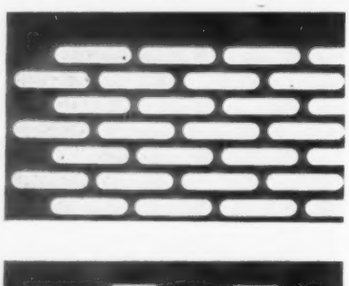

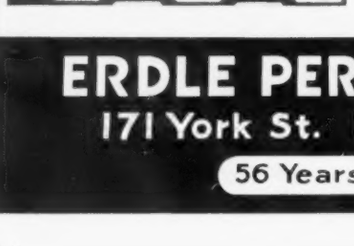

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iron and steel continues to show a slight gain over July, due in part to new automobile models and also to general improvement. Prices are steady.

Cincinnati—Volume and nature of demand have been on an even keel, lending confidence that an upward trend will be apparent after Labor Day. Sales this summer were considered exceptionally good, with demand broad from the industrial field. Prices are unchanged.

St. Louis—August volume is larger than July, and is the largest for the month since 1931. Building requirements are expanding, and general demand has failed to show the usual summer recession. Some lines, notably refrigeration, air conditioning, stoves and farm implements, are operating at a higher rate than at the same period in recent seasons. Railroad buying is confined to absolute necessities. Tool steel and alloys are active, with steady expansion in the use of stainless sheets. Prices are steady.

Seattle—Demand is spotty, most of the turnover being out of stock, with occasional mill orders. Increased demand from the country is expected shortly, as dealers will have to restock. Prices are being maintained, threatened variations having failed to develop.

Iron Ore

Iron Ore Prices, Page 143

Cleveland—Preliminary figures on Lake Superior iron ore shipments in August indicate a total of 4,750,000 tons, compared with 4,460,536 tons in July. The total for the season to Sept. 1 is approximately 17,356,029 tons. Some additional purchases of small amounts for rounding out stocks are noted.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 141

Producers of bolts, nuts and rivets have yet to name fourth quarter prices, although there is some hope that recent unsettlement in the market may be corrected. Bolts and nuts nominally are 70-10-5 off list, but concessions from this figure are general. Rivets, on the other hand, are steady, structural rivets being 2.90c, Pittsburgh and Cleveland, 3.00c, Chicago, with small sizes 70 and 5 off list.

Demand has been fairly steady recently at Chicago, August business showing little change from that of July. Specifications from farm implement manufacturers and miscellaneous consumers are in relatively better volume than from railroads. Purchases by the latter have shown practically no improvement during recent weeks.

At Cleveland the market is rather slow, except for releases which continue to come in on a hand-to-mouth basis from automobile manufacturers for present models. Demand from these manufacturers is running beyond their quarterly contracts and new orders and releases are received simultaneously.

Ferroalloys

Ferroalloy Prices, Page 142

New York—The Italo-Ethiopian crisis, combined with the somewhat strained relations between this country and Soviet Russia, has been the source of much recent speculation with regard to the future trend in manganese ore and ferromanganese prices here. What softness in sentiment has developed as a result of the pending Brazilian reciprocal treaty has been much dispelled by the recent turn of events on the other side.

There is no doubt, in the opinion of some trade leaders, that should the Mediterranean area become the scene of intensified war activities over the coming months shipments of manganese ore from the Caucasus to this country will be greatly reduced; and the present feeling in American and Russian relations tends to complicate the outlook.

Further, ferromanganese is an important munition of war and such being the case it is pointed out it is only reasonable to assume, should trouble in northeast Africa develop into a conflict of serious proportions, that much European ferromanganese and, of course, the necessary ore supplies, will be kept on the other side.

The current market on manganese is $85, duty paid, Atlantic and Gulf ports, and on domestic spiegeleisen, 19 to 21 per cent, $26, Palmerton, Pa., on quantities up to 50 tons, and $24 on lots of 50 tons and over.

Nonferrous Metals

Nonferrous Metal Prices, Page 142

New York—Major nonferrous metal prices held firm last week despite a receding volume of demand compared with the previous week. The outlook for copper, lead and zinc still favors a renewal of the uptrend in consumption experienced this month.

Copper—Prices held firm at 8.50c, Connecticut, for electrolytic with the

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undertone strong. Long-term prospects of further price gains are still favorable should sales again reach large proportions.

Lead—Demand was substantial early in the week but not sufficiently heavy or pressing to push prices above the 4.35-cent New York level. The previous week's price advances were well supported with St. Joseph still asking a $1 premium in the eastern market.

Zinc—The price tone in the market was steady at 4.60c, East St. Louis, with predictions freely made that the next price change will be upward. Demand was generally light.

Tin—Prices held remarkably steady for a metal so subject to wide fluctuations and spot closed fractionally below the 50-cent level.

Quicksilver

New York—Quicksilver prices are unchanged in a slow market. Round lots of 100 virgin flasks are $69 a flask, small lots at $70, and single flasks up to $71. Light small-lot inquiry for prompt delivery and some buying interest in large lots for future delivery have been reported.

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Steel in Europe

Foreign Steel Prices, Page 144

London—(*By Radio*)—Steel trade prospects of Great Britain are promising, following the close of the holiday period. Most departments are active, production of shipbuilding material being slackest. Denmark is buying hematite pig iron. Steel exports are increasing to South Africa, Australia and India. Galvanized sheets are quiet. South America is inquiring for black sheets. Trade in tin plate is fair.

Reports from the Continent state export trade is expanding, especially to Scandinavia, Holland, Portugal, Egypt and the Near East. An increase in Russian trade with Belgian mills is noted. Poland is reported to have obtained an order for pipe from Brazil.

Equipment

Chicago—While a slight lull has developed in activity in certain types of machinery, the outlook is bright. Small tool demand is well maintained, but orders and inquiries for machine tools are quieter. The latter situation is ascribed partly to the coming machine tool exposition. Some tool buying is looked for by International Harvester Co. for its $2,750,000 plant expansion program. About 20 tools still are pending for Chicago municipal shops. Railroads and steel plants are placing few orders for maintenance shops, but fair demand from the latter for heavier equipment is in prospect. The principal mill buyer will be American Sheet & Tin Plate Co., though another interest is contemplating mill electrification work. While Midwest Steel Corp., subsidiary of National Steel Corp., has stated that its building a mill in this district hinges on willingness of the war department to build a harbor, it is likely that Midwest's building plans will be pushed before long.

Boston—New England machine tool builders in most instances have substantial backlogs and are operating full time. New orders the past ten days have been fewer, due in part to several prospective purchasers awaiting the Cleveland show before placing business. In several machine tool centers a shortage of skilled mechanics is being felt, and builders have advanced delivery requirements further.

Construction and Enterprise

Michigan

ANN ARBOR, MICH. — King-Seeley Corp., manufacturer of automobile parts, will start construction soon of a new addition, 60 x 80 feet, to take care of increased business.

DETROIT — Interstate Tool Co., 19636 Mitchell street, will erect an addition to its factory. George W. Graves, architect, is preparing plans.

DETROIT — Seaman Patrick Paper Co., 1225 Vermont street, is building an addition to its plant.

DETROIT — Barton-Malow Co., 1900 East Jefferson street, has been awarded contract for additions to the plant of the Detroit Steel Corp., 1025 South Oakwood. The additions will be 80 x 250 feet and 80 x 120 feet, costing approximately $50,000.

DETROIT — L. & L. Stamping Corp., 134 Woodmere street, has been incorporated to deal in stampings, dies, die sets, etc., by James D. Ligon, 167 Hollywood avenue.

DETROIT — An industrial expansion program now under way at the McGraw avenue plant of the Kelsey-Hayes Wheel Co., calls for an expenditure of upwards of $1,000,000 principally for the erection and equipment of a modern production foundry. (Noted Aug. 5).

GRAND RAPIDS, MICH. — Stalter Edge Tool Co., 221 Straight street, Southwest, has been incorporated to do general manufacturing, by Francis N. Stalter, 2614 Plainfield street, Northeast.

JACKSON, MICH. — Yard-man Inc., manufacturer of lawn mowers, has leased the former Lockwood plant and is installing equipment for increased production. T. B. Funk is president.

LANSING, MICH. — Friedland Iron & Metal Co., 315 East Maple street, has been incorporated to deal in scrap and waste material, by David Friedland, 711 North Capitol avenue.

MARINE CITY, MICH. — Reid Products Co. has started construction of an addition costing about $45,000, which will more than double the size of its plant.

MUSKEGON, MICH. — Plant of the Muskegon Malleable Foundry Co. was damaged by fire twice last week.

MUSKEGON HEIGHTS, MICH. — Campbell, Wyant & Cannon Foundry Co. is planning the construction of an addition to its plant.

Ohio

CLEVELAND — Cleveland Hobbing Machine Co., 1170 East 152nd street, has awarded contract for a 2-story addition to its plant.

CLEVELAND — Elwell-Parker Electric Co., 4205 St. Clair avenue, has awarded contract for construction of a 2-story building, costing $70,000.

CLEVELAND—Eaton Mfg. Co., 739 East 140th street, has let contracts for construction of an addition to the Saginaw, Mich., plant of Wilcox-Rich Corp., a subsidiary, which will provide 19,000 additional square feet, and an extension to the Eaton Spring plant at Detroit which will provide 18,000 additional square feet.

LORAIN, O. — Fire recently caused considerable damage to several buildings of the Lorain Castings Co., subsidiary of the Thew Shovel Co. E. W. Johnston is general manager.

MANSFIELD, O. — Municipality plans sewage system and sewage disposal plant, costing approximately $250,000. J. F. Carrigan, engineer.

NEW LEXINGTON, O. — Municipality plans distribution lines, dam, pumping station, etc., in connection with waterworks system. Estimated to cost $35,000. C. T. Kaiser is engineer.

WATERVILLE, O. — Municipality plans water treatment plant estimated to cost $36,000, including equipment. George Champe & Associates, Nicholas building, Toledo, engineers.

Illinois

CHICAGO — Tuccori Mfg. Co. Ltd., 134 North LaSalle street, has been incorporated by Frank Shedwill, Carl D. Tuccori and John Lunardon, to manufacture vending and coin machines. Correspondent: Peter D. Giachini, 134 North LaSalle street.

CHICAGO — Omar Mfg. Corp., 631 West Washington boulevard, has been incorporated to manufacture vending machines, by W. R. Foreman, A. C. Moreland and Joseph E. Vesely. Correspondent: R. W. Ibenfeldt, 111 West Monroe street.

CHICAGO — Divekey Foundry & Machine Co., 111 West Monroe street, has been incorporated to engage in general foundry business, by J. O. Divekey, Adelor J. Petit Jr., and Florence Stewart. Correspondent: Petit, Olin & Overmeyer, Harris Trust building, 111 West Monroe street.

CLAYTON, ILL. — City, care of W. W. Wright mayor, plans improvements to waterworks system and sewer system. Applications to PWA for $85,000 and $68,000 respectively, have been filed. Beard Engineering Co., 41 South Central avenue, engineer.

HUTSONVILLE, ILL. — Village, R. A. Pleasant president, village council, will soon take bids for erecting pumping station and installing pumps and tank on tower. PWA grant of $39,000 has been approved. W. S. Heer Engineering Co., Bethel, O., engineer. (Noted July 22).

New York

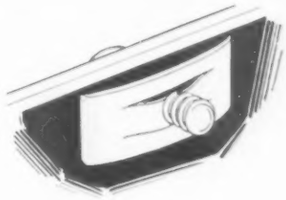
GRANVILLE, N. Y.—Village plans water supply system. PWA loan and grant of $73,350 has been applied for. H. W. Taylor, 9 Park place, New York, engineer.

LONG BEACH, N. Y.—Right Way Mattress Co., Paine street and Magnolia boulevard, plans constructing a plant. Cost will exceed $28,000, including equipment.

District of Columbia

WASHINGTON — Bureau of supplies and accounts, navy department, will take bids Sept. 10, schedule 5900, one motor-driven single spindle automatic screw machine; schedule 5901, one motor-driven multiple spindle automatic screw machine, both delivered Philadelphia; Sept. 20, schedule 5878, motors, hoists, control appliances and spare parts, delivered Portsmouth, N. H., and Mare Island, Calif.

WASHINGTON—Bureau of supplies and accounts, navy department, will take bids Sept. 6, schedule 5796, one



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motor-driven universal, tool and cutter, grinder machine; delivered Mare Island, Calif.; Sept. 10, schedule 5770, motor generator sets, control appliances and spare parts, delivered Portsmouth, N. H., and Mare Island, Calif.; schedule 5810, steel forgings; schedule 5814, seamless steel tubing for boilers; schedule 5854, one motor-driven bench lathe and spares, delivered San Pedro, Calif.

Georgia

AUGUSTA, GA.—Swift & Co., engineering department, Union stock yards, Chicago, has let contract to S. S. Jacobs Co., Hildebrandt building, Jacksonville, Fla., at approximately $69,000 for construction of branch house. Work will include 3-story plant to house modern equipment.

DECATUR, GA.—City, Scott Candler mayor, plans improvements of waterworks system for which city commission has approved expenditure of $88,102. A 500,000-gallon steel storage tank will be erected at a cost of $36,822.

Florida

PANAMA CITY, FLA.—City has $34,636 donation allotted by President Roosevelt for extension and revision of waterworks distribution system; will borrow $42,000 from PWA.

South Carolina

ABBEVILLE, S. C.—City plans to erect a municipal hydroelectric power plant, comprising concrete dam, generating plant and transmission line. Financing of $350,000 is being arranged through federal aid.

CHARLESTON, S. C.—Planters Distilling Co. Inc., P. Lester Hawks, Mt. Airy, N. C., president, has filed application with South Carolina tax commission for authority to operate a distillery here.

GREENVILLE, S. C.—Parker district, suburb of Greenville, has filed application for PWA loan of $142,000 to finance construction of water distribution system. J. E. Sirrine Co., Greenville, engineer.

West Virginia

McMECHEN, W. VA.—City council is expected to act Sept. 3 on ordinance calling election on $105,000 bonds to build municipal power plant; probably will install three kilowatt generating units, diesel engines and also steam equipment. J. M. Jenckes, power engineer, Wheeling, W. Va.

Virginia

DANVILLE, VA.—Farmers Marketing association, Route 4, wants prices and data on new or used excelsior manufacturing equipment.

RICHMOND, VA. — Molins Machine Co. Ltd., London, England, plans to establish a plant here for manufacture of cigarette and tobacco machinery. It has purchased the Davis building and will equip for use. A. Guelde-Bartcky is secretary-treasurer, Molins Machine Co.

Missouri

KANSAS CITY, MO.—American Safety Tank Co. has been organized by Louis Lowenstein and A. E. Haas, 1822 Main street, to manufacture iron, steel and metal tanks.

KANSAS CITY, MO.—Current River Power Co., 1105 R. A. Long building, has applied to federal power commission for a preliminary permit to construct a hydroelectric plant on Current river. Estimated cost $2,000,000.

KIRKWOOD, MO.—City, A. S. Kinyon mayor, plans $60,000 sewage disposal plant. Will apply for PWA grant Joseph N. Wilson, city engineer, City Hall.

Arkansas

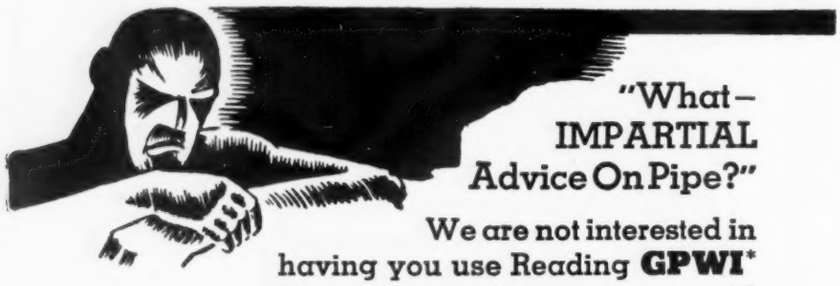
COTTON PLANT, ARK.—City has received PWA funds for construction of sewer system, work to begin soon.

Texas

DAWSON, TEX.—City, W. P. Johnson mayor, has voted $53,000 to extend and improve waterworks system.

HOUSTON, TEX. — Metzger Dairies plans to enlarge its plant at 3115 D'Amico street, and will install new equipment at a cost of $75,000. Leo Segal, manager.

LONGVIEW, TEX.—City applied to PWA for grant of $348,067 for con-



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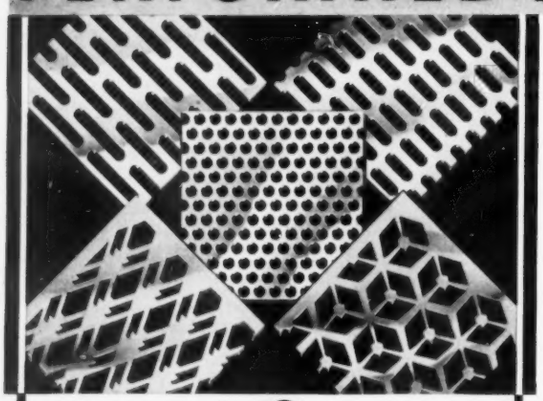

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structing new waterworks system. Total cost approximately $773,482.

ABILENE, TEX.—Johnson Tool & Machine Co. has established a shop at Eleventh and Mesquite streets, by J. J. Johnson.

DILLEY, TEX.—Acme Machine & Welding Co. has established a shop here for repair of oil field tools. Harry J. Rogers is shop superintendent.

KILGORE, TEX.—Waxler Bit & Machine Co. has been organized by L. A. Waxler to operate a machine shop for repair of drilling bits.

OVERTON, TEX.—General Machine & Tool Co. has established a shop here for oil field work. Otto and Roy Schlemeyer are the owners.

Wisconsin

OSHKOSH, WIS.—City has applied for federal aid to build sewage treatment plant and intercepting sewers, estimated to cost $920,000. Plans are by Robert Cramer & Sons, engineers, 647 West Virginia street, Milwaukee.

RACINE, WIS.—Rasmussen Machine Co., recently incorporated, is equipping the second floor of an industrial building at Eighth and Mead streets, for manufacture of cutting-off machines and other mechanical devices. Charles Rasmussen, 1625 Boyd avenue, is president.

SUPERIOR, WIS.—Chicago, St. Paul, Minneapolis & Omaha Railway Co. has awarded contract to James Leck Co., 211 South Eleventh street, Minneapolis, for construction of a 15-stall roundhouse to cost about $50,000.

Minnesota

MOORHEAD, MINN. — City plans construction of an addition to municipal light and power plant, including additional power plant equipment, to cost about $100,000. Ralph D. Thomas, 1200 Second avenue, South, Minneapolis, is engineer.

WINONA, MINN. — United States government plans erection of a 2-story survey warehouse and boat yard for biological survey, including marine railroad, and barge loading equipment.

Kansas

BURRTON, KANS.—Farley Machine Works, Arkansas City, Kans., has moved its main shop here, with branch plants at Hays and Russell, Kans. Jack Farley is president and John Wiley is shop superintendent.

North Dakota

WEST FARGO, N. DAK.—Midwestern Union Stock Yards association, Thomas E. Good president, has under way a $200,000 building program. J. C. Lutz is engineer in charge of construction.

Pacific Coast

SAN FRANCISCO—Ducommun Corp., engaged in nonferrous and steel metal distribution, has completed arrangements to enlarge its Townsend street plant. The proposed plant will house a new, large crane and will provide 150,000 square feet of floor space. Total expenditure will be between $30,000 and $40,000. E. H. Breidenbach is local branch manager.

HILLSBORO, OREG.—Industrial Distilleries Ltd. is awaiting a federal permit before erecting a $75,000 plant here.

SPOKANE, WASH.—Improvements at the Irvin plant of the Spokane Portland Cement Co., costing $250,000, are under way. Machinery, including loading equipment, is being installed, increasing the capacity and shipping facilities.

VANCOUVER, WASH.—W. T. Crawford has been granted a permit to rebuild a stage terminal, work to include additions to accommodate garage and shops.

YAKIMA, WASH.—Preliminary plans have been prepared for a sewage disposal system and plant to cost $158,000. Financing is being arranged. Stevens & Coon, Portland, Oreg., are consulting engineers.

Dominion of Canada

MISSION, B. C.—P. Bain Lumber Mills Ltd. plans to erect a new plant, costing approximately $100,000, including equipment.

BURWASH, ONT. — C. S. Walters, deputy minister, department of public works, Toronto, Ont., plans constructing a pump and filter house and will install filter equipment, pumps, and piping. James, Redfern & Proctor, 36 Toronto street, Toronto, engineers.

OSHAWA, ONT.—General Insulating & Mfg. Co., Alexandria, Ind., has secured a six-acre site here and plans erection of a plant, cost of which is estimated at $50,000.

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Illinois Steel Co., 208 So. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.

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American Bridge Co., Frick Bldg., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
McClintic-Marshall Corp., Bethlehem, Pa.

BARRELS (Plating)
The Udylite Co., 1615 E. Grand Blvd., Detroit, Mich.

BARRELS (Steel)
Pressed Steel Tank Co., Milwaukee, Wis.

BARS (Alloy)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Timken Steel & Tube Co., Canton, O.

BARS (Concrete Reinforcing)
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Youngstown Sheet & Tube Co., Youngstown, O.

BARS (Iron)—See IRON (Bar)

BARS (Steel)
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Republic Steel Corp., Youngstown, O.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown Marx Bldg., Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

BEAMS, CHANNELS, ANGLES, ETC.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

BEARINGS (Ball)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Norma Hoffmann Bearings Corp., Stamford, Conn.
New Departure Mfg. Co., Bristol, Conn.

BEARINGS (Bronze)
Cadman, A. W., Mfg. Co., 2816 Smallman St., Pittsburgh, Pa.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.
Rhoades, R. W., Metaline Co., 50—3rd St., Long Island City, N. Y.
Shenango-Penn Mold Co., Dover, O.

BEARINGS (Journal)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
Link-Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Oilless)
Rhoades, R. W., Metaline Co., 50—3rd St., Long Island City, N. Y.

BEARINGS (Quill)
Bantam Ball Bearing Co., South Bend, Ind.

BEARINGS (Radial)
Bantam Ball Bearing Co., South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
New Departure Mfg. Co., Bristol, Conn.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Roller)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
Norma Hoffmann Bearings Corp., Stamford, Conn.
S K F Industries, Inc., Front St. & Erie Ave., Philadelphia, Pa.
Timken Roller Bearing Co., The, Canton, O.

BEARINGS (Roll Neck)
Bantam Ball Bearing Co., The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago, Ill.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Roller Tapered)
Bantam Ball Bearing Co., South Bend, Ind.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Rolling Mill)
Bantam Ball Bearing Co., South Bend, Ind.
Cramp Brass & Iron Foundries Co., Paschall Sta., Philadelphia, Pa.
Hyatt Roller Bearing Co., P. O. Box 476, Newark, N. J.
Lawrenceville Bronze Co., Bessemer Bldg., Pittsburgh, Pa.
Norma Hoffmann Bearings Corp., Stamford, Conn.
Timken Roller Bearing Co., Canton, O.

BEARINGS (Thrust)
Bantam Ball Bearing Co. The, South Bend, Ind.
Fafnir Bearing Co., New Britain, Conn.
Norma Hoffmann Bearings Corp., Stamford, Conn.
Timken Roller Bearing Co., The, Canton, O.

BENDING AND STRAIGHTENING MACHINES
Kardong Bros., 346 Buchanan St., Minneapolis, Minn.
Morgan Engineering Co., The, Alliance, O.
Thomas Spacing Machine Co., Pittsburgh, Pa.

BENZOL AND TOLUOL RECOVERY PLANTS
Koppers Construction Co., 1438 Koppers Bldg., Pittsburgh.
Youngstown Sheet & Tube Co., Youngstown, O.

BILLETS (Alloy and Carbon Steel)
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., Newport, Ky.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. La Salle St., Chicago, Ill.
Republic Steel Corp., Youngstown, O.
The Stanley Works New Britain, Conn. Bridgeport, Conn.
Timken Steel & Tube Co., Canton, O.
Washburn Wire Co., Phillipsdale, R. I.

BILLETS (Forging)
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., Newport, Ky.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh, Pa.
Midvale Co., The, Nicetown, Philadelphia, Pa.
Republic Steel Corp., Youngstown, O.
Standard Steel Works Co., Burnham, Pa.
The Stanley Works, New Britain, Conn. Bridgeport, Conn.
Timken Steel & Tube Co., Canton, O.

BILLETS AND BLOOMS
Alan Wood Steel Co., Conshohocken, Pa.
Andrews Steel Co., Newport, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie Steel Co., 327 Carnegie Bldg., Pittsburgh, Pa.
Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill.
Inland Steel Co., 38 So. Dearborn St., Chicago, Ill.

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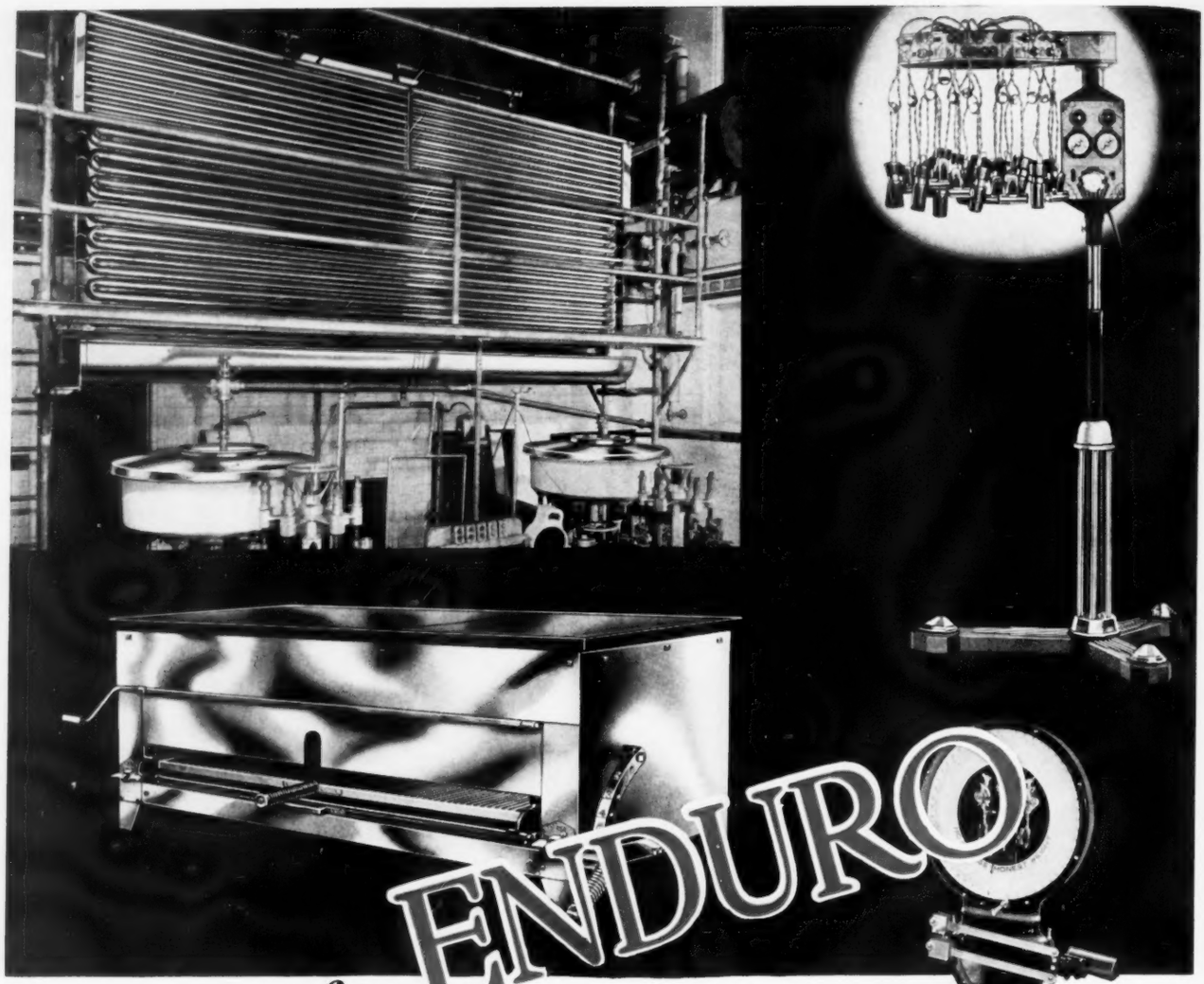

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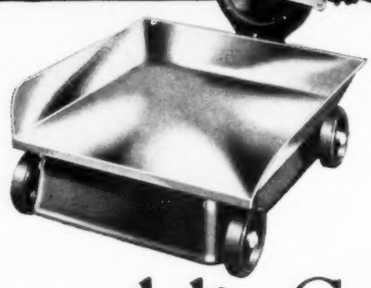

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As the Editor Views the News

ACTION of a subsidiary of U. S. Steel in setting up an agency for selling pig iron virtually completes an important chapter in the evolution of the American merchant pig iron business. Forty years ago practically every rolling mill bought its pig iron from operators of merchant blast furnaces. Twenty years later, in the move toward integration, many mill interests acquired their own stacks, although much iron still was purchased from merchant producers. Today, most of the integrated steel companies now are sellers of pig iron (p. 17) and are competing directly with the merchant operators who once supplied them. An almost complete reversal has occurred.

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The evolution that has occurred in the marketing of merchant iron has its counterpart in every other branch of the metalworking industries. The manufacturer who is making and selling a certain product profitably today cannot be sure that his franchise on the business will be intact a year hence. To insure success over a long period he must be quick to adjust his operations to constantly changing economic conditions. This means that he must size up new developments with an open mind. Blind loyalty to pet ideas and unreasoning prejudice against innovations (p. 29) are responsible for an undue share of the mortalities which occur in business.

Franchise Is Not Permanent

• • •

Chairman Madden of the new national labor relations board got off on the right foot when he emphasized the limitations of the board in dealing with labor disputes. Labor union leaders and new dealers have glorified the Wagner act so far beyond its possibilities that local labor agitators are expecting the board to help them unionize open-shop plants. Already A. F. of L. (p. 25) has filed complaints against a number of companies in the steel and automobile industries. Chairman Madden undoubtedly is wise in warning union leaders not to expect too much from the board. By the time the question of the constitutionality of the act has been thrashed out and the conflict between vertical and crafts unions in A. F. of L. has run its course, the Wagner act may be something less than the magna charta it was supposed to be.

NLRB Not a Panacea

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Machine tool builders will tell you that a good, reliable source of castings suitable for the exacting requirements of modern machine tools is a priceless asset. Foundrymen, with equal frankness, will swear that a steady customer of quality castings who does not expect the impossible is a rarity. However, if builders and foundrymen can get together on the proper basis of understanding and co-operation, remarkable results can be achieved. This has been proved conclusively by the experience of an Ohio builder of turret lathes (p. 32) who has found a small foundry which, in addition to knowing the real meaning of the word "service," has developed some novel ideas in foundry management.

Service With Capital "S"

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Refinement follows refinement in industry today. Customers demand closer adherence to more difficult specifications. Manufacturers, recognizing this trend, are going to great lengths to meet the new requirements. Typical of their efforts in this direction is the action of a steel producer in installing (p. 40) a recently developed "classifier" for sheets and tin plate. This device sorts flat rolled material according to narrow ranges of gage, permitting the seller to meet the specifications of the most meticulous buyer. When critics compare today's prices with those of 10 or 20 years ago, they should make allowance for the greatly improved quality of the material now available. The buyer's dollar goes considerably farther than is generally realized.

Customers Ask More Today

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